

I 1910  
Larchmont  
Granite

Canton  
Klondike  
Aspen  
Shingle

Shoreline



J. E. Carman  
Bayard  
La.



1240 - bottom - 1  
1260 - R.R. in cut  
1270 - top of gravel in cut  
1285 - " " cut - " " "









5



Aug. 15, 1910

7

Reached Larchwood at 9<sup>30</sup>  
P.M. Stormed heavily all  
night.

Aug. 16, 1910

Met Mr. Wood.

We read proof & took photos  
p.m.

33 & 34 - Looking W. toward old fall  
— place. Street with soft moccasins,  
am. elms & green ash.

13 & 14 - Looking W. toward park - Austrian pine

29 & 30 - Looking N. among Austrian Pines  
Ground covered with needles.

3 & 4 - Looking N. - Green ash seedlings  
at S. side of Austrian pine grove.

✓ 9 - Large box elder - looking S.W.

✓ 10 - Canada thistles - in park along RR

✓ 4 - Canada thistles - looking W.

Afternoon read proof & walked  
down track to W.

Here is prairie on what appears  
to be Kansan drift. A small  
W. shows gravel <sup>in middle layer</sup> to top.



List of plants - Larchmont.

- Asclepias speciosa* - lvs. -  
*Cheopodium leptophyllum* - fls  
*Aster sericeus* - lvs  
*Poa compressa* - fr.  
*Panicum Scribnerianum* - fr. & fls  
*Astragalus canadensis* - fls & fr  
*Aster multiflorus* v. lvs & fls  
*Cirsium arvense* - fls & fr  
*Muhlenbergia racemosa* - fr  
*Carex festucacea* - fr. (all)  
*Asclepias syriaca* - fr. & fls  
*Elymus canadensis* - fr  
*Coultis palustris* - fr. few fls  
*Lithospermum angustifolium* - fr.  
*Koeleria cristata* - fr. (all)  
*Lactuca canadensis* - fr. & fls  
*Polygonum ramosissimum* - fls. & fr.  
*Benthamia nemoralis* - fls  
*Lactuca ludoviciana* - fls  
*Festuca scaberrima* - lvs & fr  
*Syntherisma juncea* - fr. & fls  
*Petalostemon candidum* - fls.  
                     *purpureum* - fls  
*Cirsium discolor* (or all?) - fls  
        *discolor* - fls  
*Anemone cylindrica* - fr.  
*Oenothera biennis* - fr.  
        *puberula* - fr.

- Solidago nemoralis* fls  
*Fragaria virginiana* lvs  
*Lithospermum canescens* lvs  
*Prototoma arifolia* fr  
*Sorghastrum nutans* fls  
*Andropogon scoparius* fr fls  
*Oenothera biennis* fls  
*Bimneria angustifolia* fr. & fls  
*Polygonum convolvulus* fls  
*Agropyron tenerum* fr  
*Phlox pilosa* fr. & fls  
*Erigeron canadensis* fls  
*Solidago rigida* fr  
*Verbena canadensis* fls  
*Potentilla arguta* fr  
*Passiflora incarnata* fls & fr  
*Antennaria ludoviciana* fr  
*Asclepias verticillata* fr  
*Solidago missouriensis* fls  
*" nemoralis* fls  
*" canadensis(?)* fls  
50 *Equisetum laevigatum* - sterile  
*Lactuca scariola* - fls  
*Helianthus scaberrimus* - fls  
*Rosa pratincola* fr  
*Panicum virgatum* fls  
55 *Lepachys pinnata* fls  
*Achillea millefolium* fr. lvs  
*Helianthus scaberrimus* fls  
*Trifolium sp.* fr. fls  
60 *Helianthus maximiliani* fls  
*" "* fls



4. *Asplenium platyneuron* frs  
*Helioselin scabra* fls  
*Pandora argophylla* fls  
*Cypripedium glyptophyllum* fls & fr  
*Antennaria*  
*Astragalus caryocarpus* fr  
*Oxalis stricta* fr  
*Lepidium albidum* fr  
*Androsace artemisioides* fls  
*Hedysarum hirsutum* fr  
*Plantago aristata* fr  
*Eriogonum beringianum* fr  
*Oxytropis lanata* fls  
*Agropyron Smithii* fr & fls  
*Androsace pilululifera* fls  
*Limonium sulcatum* fr & fls  
*Verbena stricta* fls  
*Convolvulus sepium* fls  
*Penstemon grandiflorus* fr  
*Physalis pubescens* fr  
*Urtica pedatifida* fr  
*Rumex crispus* fr  
*Desmodium canadense* fls & fr  
*Aster laevis* fr  
*Cirsium altissimum* fls  
*Phacelia pruinosa* fls & fr

Aug. 17, 1910

11

Trip to Esquimaux (Loon Kana)  
*Aster alpinus* fr  
*Aster flammula* fls  
*Liatris punctata* fls  
*Echinops crassifolius* fls  
*Verbena bracteata* fls  
*Euphorbia corollata* fls  
*Geranium asperum* fls  
*Lobelia* fls  
*Comandra Richardsonii* fr  
*Helioselin scabra* fr  
*Calluna stelleri* fls  
*Equisetum arvense* fr  
*Liatris pycnostachya* fls  
*Sparganium angustifolium* fls  
*Verbena bracteata* fls  
*Rumex crispus* fls  
*Lactuca pulchella* fls  
*Aster novae-angliae* fls  
*Hedysarum pubescens* fr  
*Urtica cuneata* fls  
*Brassica arvensis* fls & fr  
 " *nigra* fls & fr  
*Polygonum pennsylvanicum* fls  
*Plantago rugelii* fls & fr  
*Prunella angustifolia* ? fls  
*Aster azureus* ? fr  
*Aster laevis* ? fr  
*Aster multiflorus* fr  
*Cirsium discolor* fls  
 30 *Prunella aspera* fls



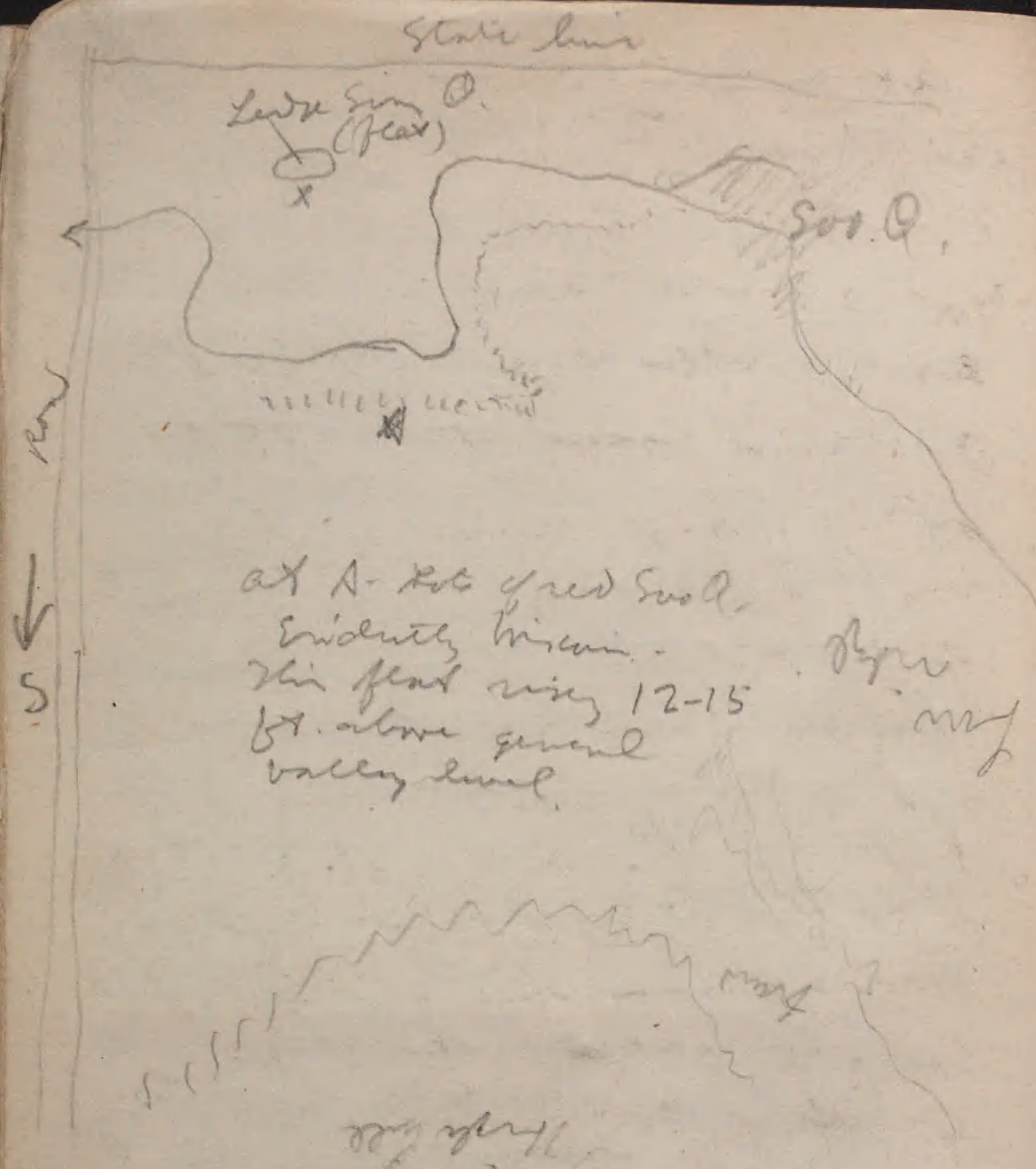
~~Erigeron acutifolius~~ fls  
~~Lepachys columini~~ fls  
~~Marrubium vulgare~~ fls  
~~Silphium laciniatum~~ fls  
~~Trifolium pratense~~ fls  
~~Sedum glaucum~~ fls  
~~Veronica perfoliata~~ fls  
~~Eragrostis megastachya~~ fls  
~~Aporosa canbina~~ fls  
~~Helianthus annuus~~ fls  
~~" annuus~~ fls  
~~Asperula officinalis~~ fr  
~~Silphium carpes~~ fr  
~~Rudbeckia cristata~~ fr  
 n.w.  
~~Aster plerianus~~ fls  
~~Primula aspera~~ fls  
~~Helianthus annuus~~  
~~Erigeron~~  
~~Oxybaphus floribundus~~ fls  
~~Scindelia squarrosa~~ fls  
~~Salix alba~~ fr  
~~Aporosa officinalis~~ fr  
~~Helianthus annuus~~ fls (plum)  
~~Coreopsis palmata~~ fls  
~~Aporosa canbina~~ fls  
~~Helianthus annuus~~ fls

Micrantha (astomum)  
~~Artemisia caudata~~ fls  
~~Lepachys columini~~ fls  
~~Eragrostis megastachya~~ fr  
~~Oxybaphus floribundus~~ fls  
~~Oxybaphus floribundus~~ fr  
~~Erigeron~~  
~~Scindelia squarrosa~~ fls  
~~Artemisia dracunculifolia~~ fls  
~~Aster oblongifolius~~ fls  
~~Silphium laciniatum~~ fls  
~~Primula aspera~~ fls  
~~Scindelia squarrosa~~ fls  
~~Helianthus annuus~~ fls (1 spec)  
~~Oxybaphus floribundus~~  
 at estate  
~~Elymus canadensis~~ fls  
~~Artemisia annua~~ fls  
~~Erigeron annuus~~ fls  
~~Artemisia annua~~ - fr  
~~Erigeron annuus~~ fls  
~~Solidago missouriensis~~ fls  
~~Scindelia squarrosa~~ fls  
~~Erigeron annuus~~ fls  
~~Scindelia squarrosa~~ fr  
~~Lepachys columini~~ fls  
~~Scindelia squarrosa~~ fls  
~~Cirsium discolor~~ fls  
~~Lygodesmia juncea~~ fls  
~~Stipa spartea~~ fr  
~~Silphium laciniatum~~ fls  
~~Boottia cuneifolia~~ fr  
~~Artemisia dracunculifolia~~ 3 fls  
~~Aster annuus~~ fr  
~~Helianthus annuus~~ fls









at Big Sioux - new corner <sup>17</sup>  
Big Sioux Riv. = 0

Found flat = 15 ft.

Top of ledge & about  
level of upper flat = 40 ft.

At turn of granite road = 75 ft

at top of ridge on road,  $\frac{2}{3}$  of the  
way between two roads - 5 p.m. turn to  
granite = 115

Along the road leading S. along W.  
side of sec. 7, boulders may be  
seen about  $\frac{1}{2}$  way up slope (total  
above flat to top of ridge = about 40 ft.)  
There are many Sioux Q. boulders  
but also numerous dark-green  
granite boulders, etc.

Evidently this is Kansan.

To summit then the nodular  
loess (see sample) shows in  
road.

Cut one (1) is on n. side near  
N.W. cor. of sec. 18 - Sioux Mt.

It shows 2 or 3 ft of nodular loess  
near upper part, & toward corner  
Kansan drift is exposed.



Kansan appears all along  
the <sup>road</sup> which runs  
runs on side of slope.  
Top of hill at X = 160 ft  
above Big Sioux.

On W. side of NW 1/4 sec. 19 - shows  
Top a deep gutter (6 ft deep)  
shows stratified gravels  
with 1 to 2 ft. of yellowish  
laminar alluvium on top.

RR pit W. of Granite shows  
stratified gravel & some  
sand (fine) cross-bedding  
shows some. Belts oxidized  
west of creek is "altamont  
varian" with big boulders on  
sides.

Aug. 18, 1910

19

Trip SW, south + west from  
Landward.

✓ Photo 33 - Looking SE. across  
prairie from NW cor. sec. 6, Logan Twp.

✓ Photo 34 - Looking N. from same  
point. Dense willow bushes.  
Visited <sup>Hans</sup> Smith's pit in NW 1/4  
NW 1/4 13-99-48 (continued by)

This is the Hans Smith's pit.  
This is said to be the best  
pit, - nearest other pit <sup>being</sup> at  
Klondike.

This <sup>(Smith)</sup> pit is exposed 20 ft.  
The upper 1-2 ft is dark soil  
mixed with a few pebbles, etc.  
The line between this & gravel  
bed is not sharp or old looking.  
Then comes a mass of fine  
sand to left, interbedded with  
coarser sand, etc. Then  
cross-bedded gravel & coarse sand.  
There are numerous white  
nodules and there is much  
iron and numerous bands of



Men O<sub>2</sub>. A farmer working in pit says they have found clam shells (broken & bleached) in the gravels.

The largest boulders are 6-8 in. So Quartz is abundant & there are rotten granite boulders (not numerous)

There are also numerous "nodules" of what appears to be Kansan drift, (See samples)

A pit sunk 40 ft. S of edge of pit shows 2 ft. of boulders & clay mixed, the latter bluish gray but soft, with pebbles here and there. Also oxidized in irregular streaks. Fine sand appears ~~here~~ below, & no sharp oxidized line separates the two.

The boulders, ~~are~~ scattered all over this bench are old, dark, weathered, a few Sioux Q., but mostly dark

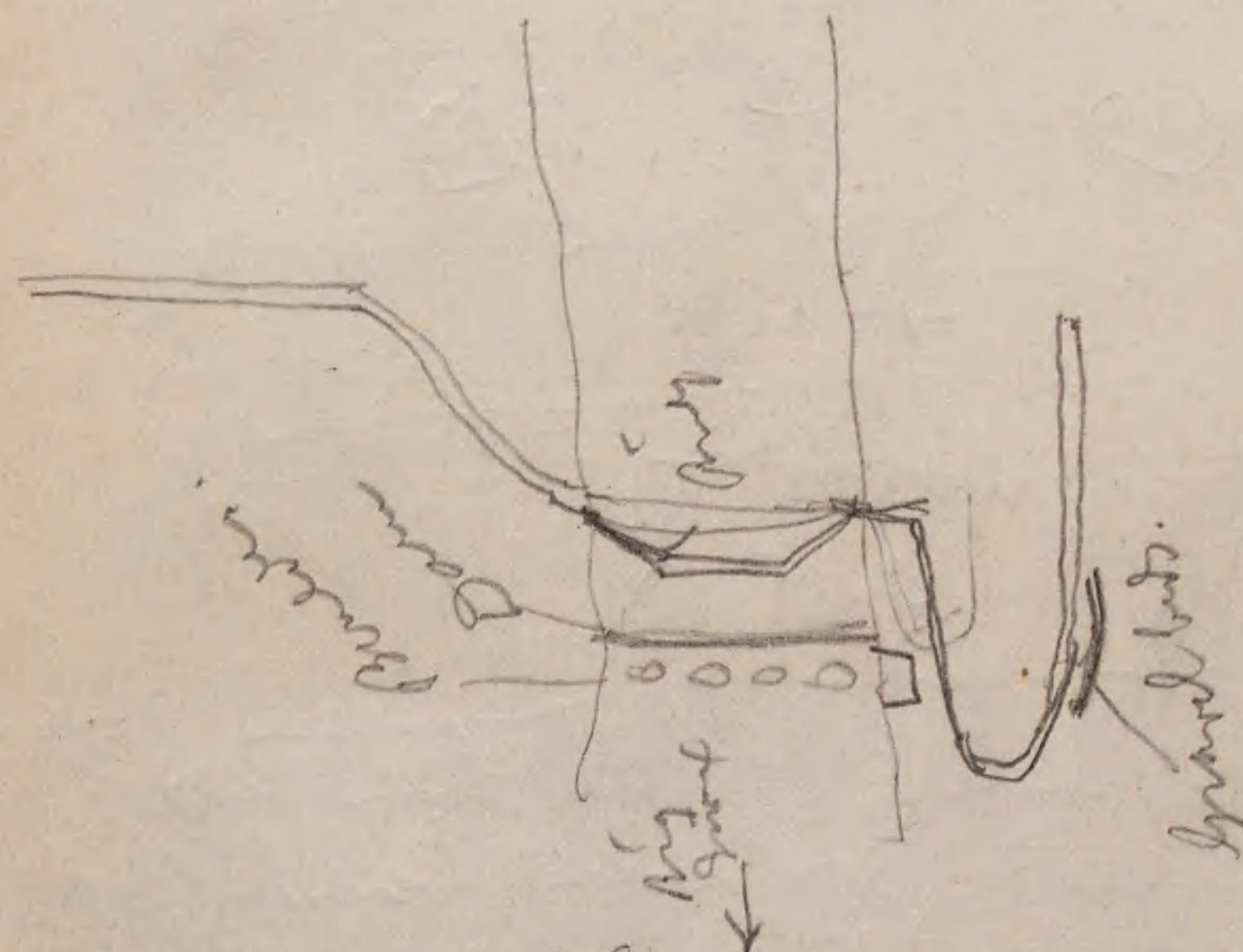
21  
green or granite (or brown) etc.  
It is surely Kansan, & if so the gravels are Aftonian.

✓ 5	-	Ham Swift pit.	
✓ 6	-	" " "	more distant
✓ 7	-	" " "	near
✓ 8	-	" " "	"



Mon. Aug. 1-1910 - Lookout plain  
 Aug. 2 - " } May 21,  
                   " } Prairie "  
 " 3 - Prairie SE.  
 " 4 - Woods SE.  
 " 5 - " " (Laural)  
 " 6 - Hotel Orleans  
 Sun " 7 - ———— changed driving  
           " 8 - wrote  
 " 9 - Zennaro Park.  
 " 10 - worked in.  
 " 11 - Lunch to W. Okelezi  
 " 12 - am. clam - pm. N. end. walked  
 Sat " 13  
 Sun " 14 wrote, changed driving, etc.  
 " 15 Rainy - left.

Aug. 19, 1910 23  
 Left Canton at 9 am for drive  
 to Klondike.  
 at Klondike (US 421 - Centennial Hwy)  
 there is a dam. collected a few  
 mollusks.



The gravel beds are coarse, some  
 good boulders, much oxidized &  
 looking old. Cross-bedded.  
 Old when gravel occurs, - quite a lot.  
 Certainly looks Aftonian.  
 About 12 ft. exposed. Pockets &  
 layers of sand. Just a level with  
 top of bridge arch (30 ft?)  
 The upper 2-3 ft is mostly boulders 3-6  
 in. in diam.



Mon. Aug. 1 - 1910 - Lookout train

Aug. 2 - " } May 2,  
                                { Prairie "

" 3 - Prairie SE.

" 4 - Woods SE.

" 5 - " " (Lunch)

" 6 - Hotel Orleans

Sun " 7 - ——— changed dining  
  table

" 8 -

" 9 - Terrace Park

" 10 - worked in

" 11 - Lunch to W. O'Leary

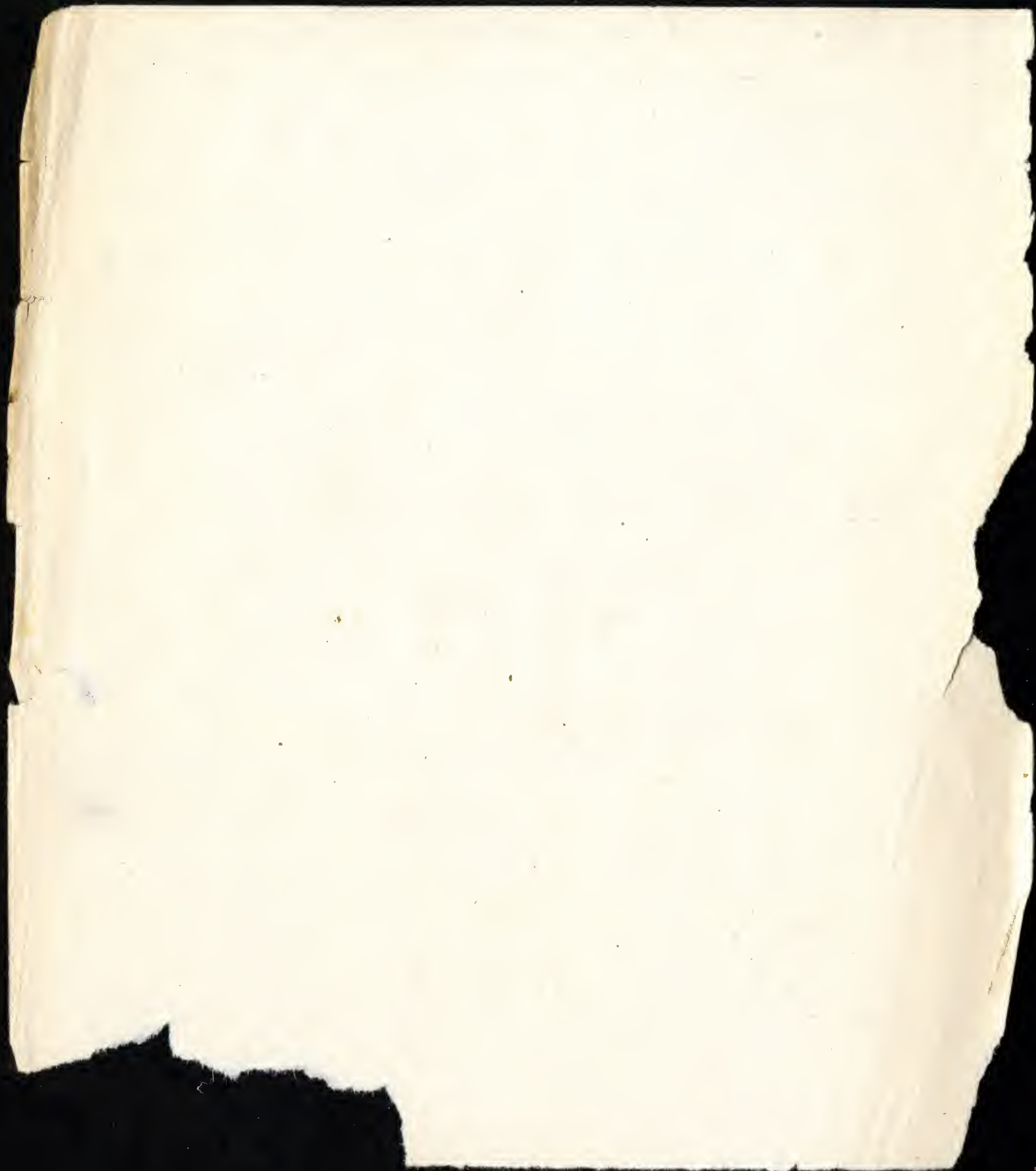
" 12 - Am. Club - Pm. N. end, walk

Sat " 13

Sun " 14 write, changed dining, etc.

" 15 Raining - left



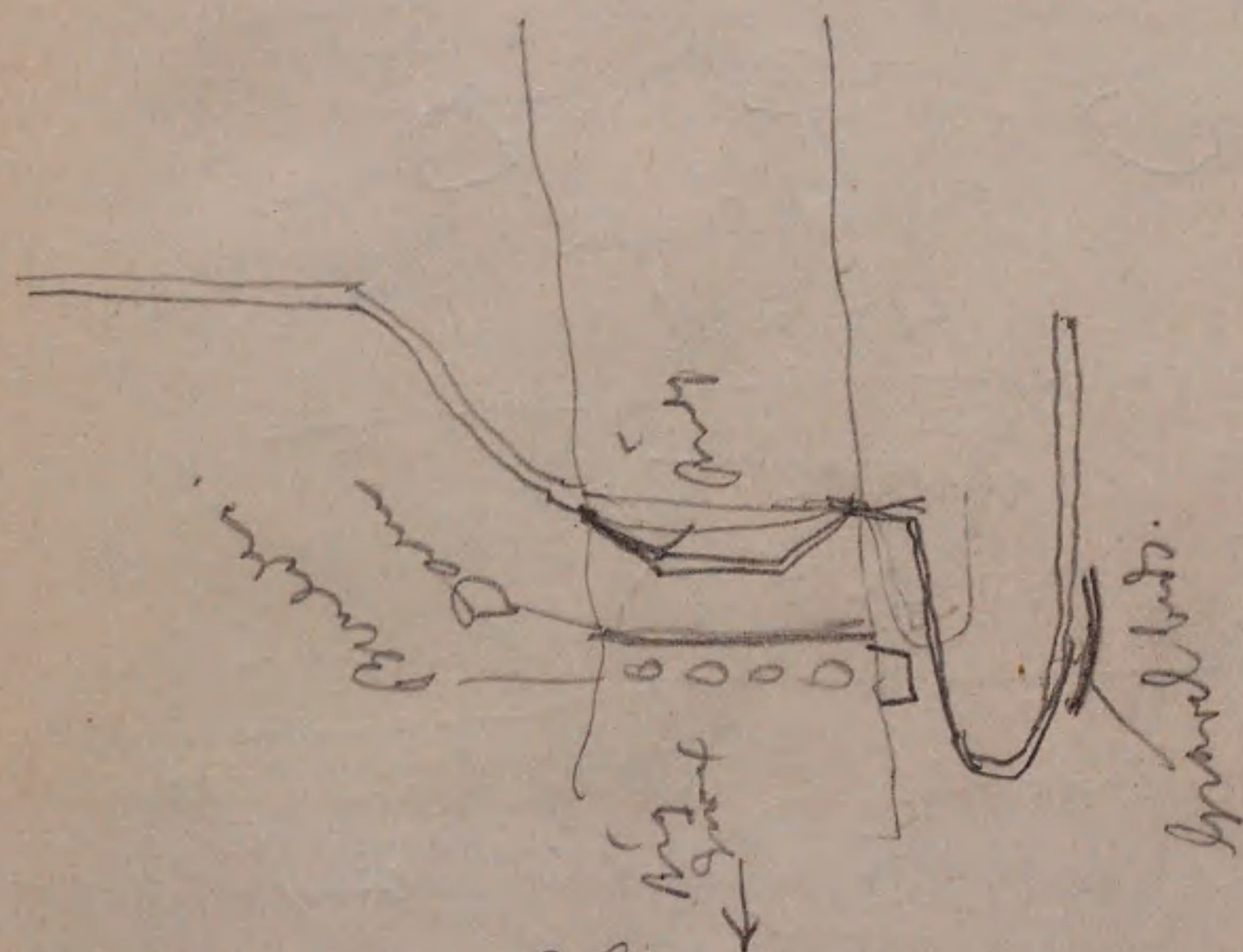




Aug. 19, 1910

Left Canton at 9 am for drive  
to Klondike

at Klondike (US 21 - Central Hwy)  
there is a dam. collected a few  
mollusks



The gravel bed is coarse, some  
good boulders, much oxidized &  
looking old. Cross-bedded.

Old rotten granite occurs, - quite a lot.  
Certainly looks Aftonian  
About 12 ft. exposed. Pockets &  
layers of sand. Just a level with

top of bridge arch (30 ft?)  
The upper 23 ft. mostly boulders 3-6  
in. in diam.



Drove up to N. line of sec 17 (centennial <sup>99-48</sup> <sub>NE 1/4</sub> <sup>24</sup> <sub>1</sub> <sup>24</sup>)  
Here on S. side of creek is a sand pit &  
bank exposed. Strong

about 40  
ft. long

There is none less sharp.

Work photos (1, 2, 29, 30, 3, 4, 13, 14)  
shorter

3<sup>rd</sup> cut

2<sup>nd</sup> cut

2 1/4 mile zone

1-2 000 pebbles & soil matrix

16 ft. + sand 1-1 1/2 ft

700 ft. +

2<sup>nd</sup> cut (quartz)

Main cut

16 ft. +



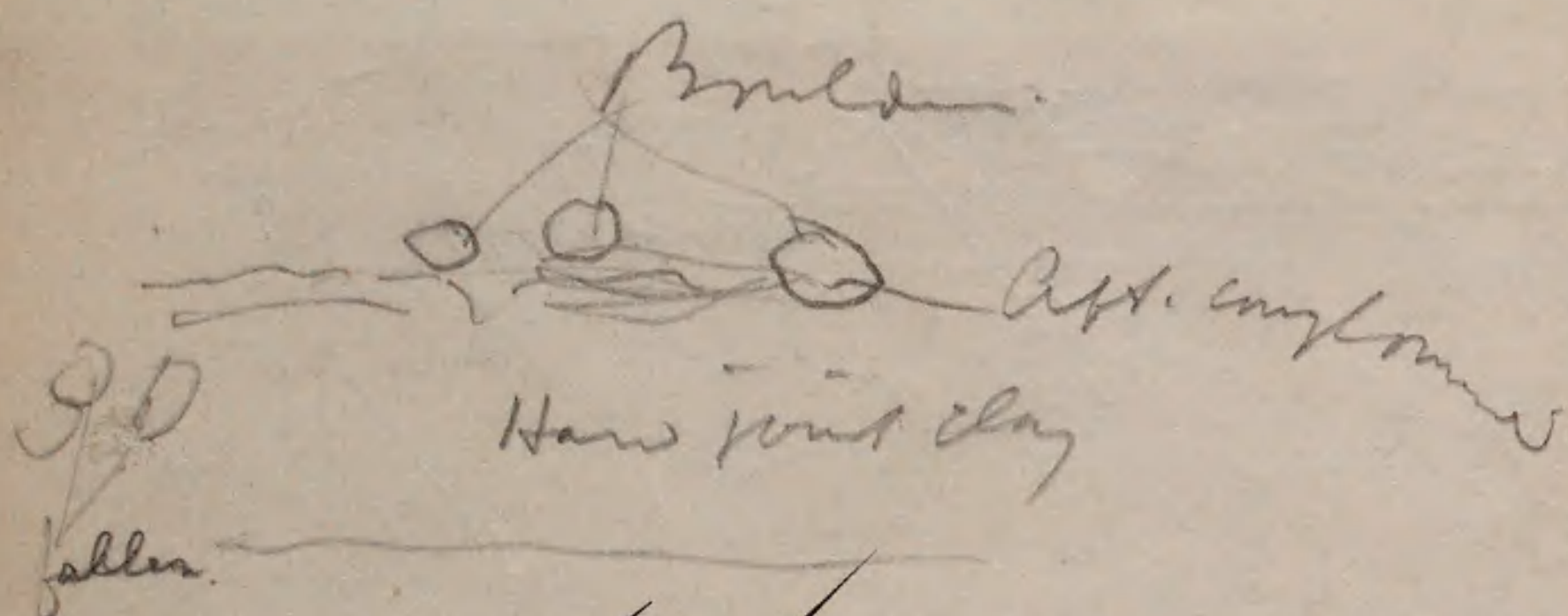
The 3<sup>rd</sup> cut shows (on W. side)

4-6 ft. of a thin compact  
greenish (dark below) clay  
(Photos 19-20 & 23-24 show  
cut 3-)

evidently has Aftonian soil or  
more likely Nebraskan)

Above this clay is about 2 ft  
of conglomerate, - typical Aftonian  
& shrimps are everywhere about  
here. ✓ ✓

Photos 7 & 8.

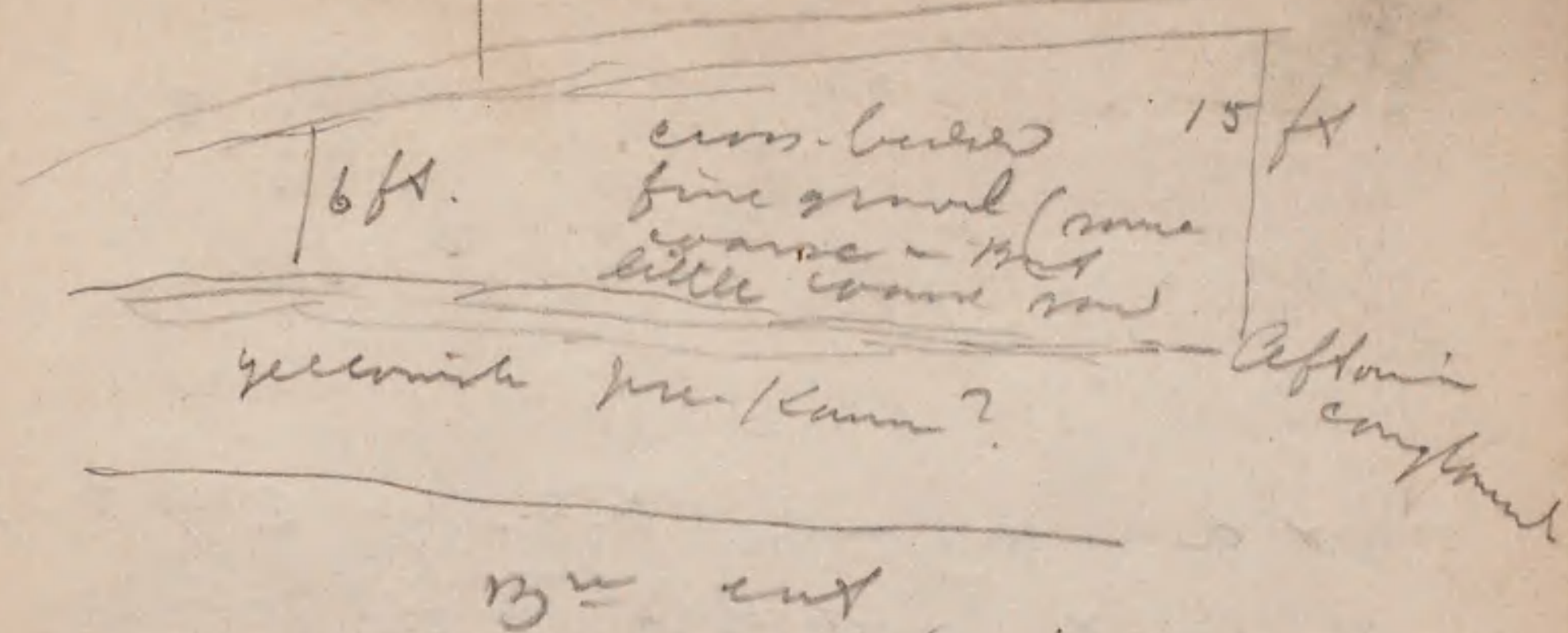


Photos 33 & 34 looking SW  
at whole cut

Boulders fall below conglomerate  
or are in its lowest part.

pebbly soil 1 ft

27



Picked up numerous animal  
shells in banks of creek  
numerous buffalo bones are  
scattered along the creek

The great Aftonian plain  
extends as represented on map  
and the hills (Nebraskan?) rise  
quite abruptly above this.  
The Aftonian plain has a  
rather narrow valley cut out by  
the S.E. creek.

The S. side of this creek gives a  
beautiful illustration of forest in  
shelter. Same on S. Dak. side  
above Klondike.



Cut a - n. side N.E. 1/4 298-48

Here at foot of a small rise  
(on W. side) Kansan drift shows  
at foot, then a little lighter  
post-Kansan loess, & then 5-6 ft  
of yellow loess - upper stratum  
nodular in usual fashion.

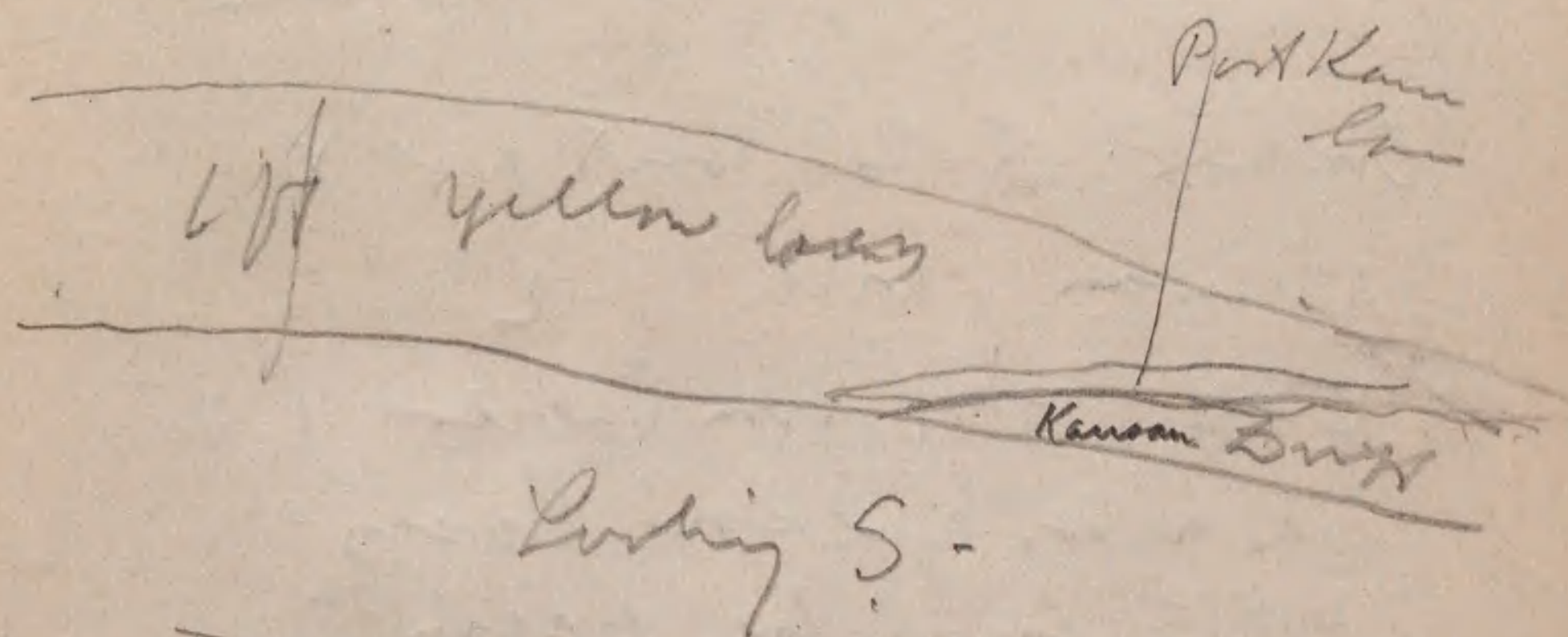
On E. side same ridge there  
also shows less satisfactorily.

On E. side of same ridge (S. of  
N.E. corner) in creek valley  
bluff (low) - probably part  
of bench, gravel appears  
& some is stratified. - Probably  
a blower.

On N. side 14-98-48 a cut  
shows Kansan, post-Kansan loess  
& yellow loess. Nearly all  
the hills (ridges) in this

29  
part show drift at surface -  
at this point (on the slope to  
west) the drift shows plainly  
to near top of hill.

Then a streak of post-Kansan  
(about 1 ft deep) is capped  
with 5-6 ft. (or a little  
more) of yellow loess - nodular  
above.

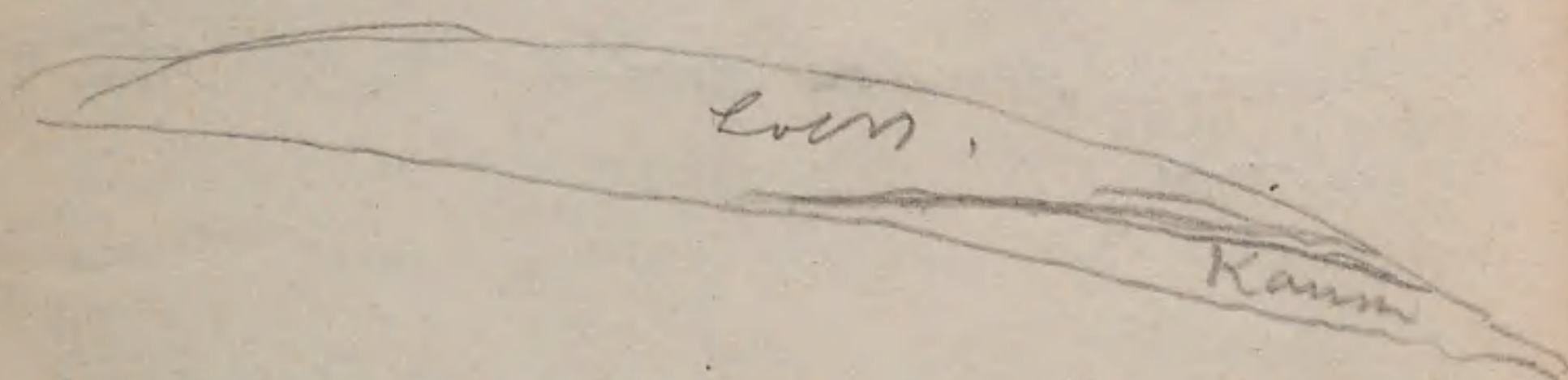


The lower places along  
RR. are in a valley.  
Stratified stuff appears  
west of above cut (W. of RR.)



Near SE corner 10<sup>(2)</sup>

Kansan shows  $\frac{1}{2}$  way up hill  
& then yellow loess (nodular  
above) 6 or 7 ft. Saw  
no blue loess  
upper part of Kansan (oxidized)

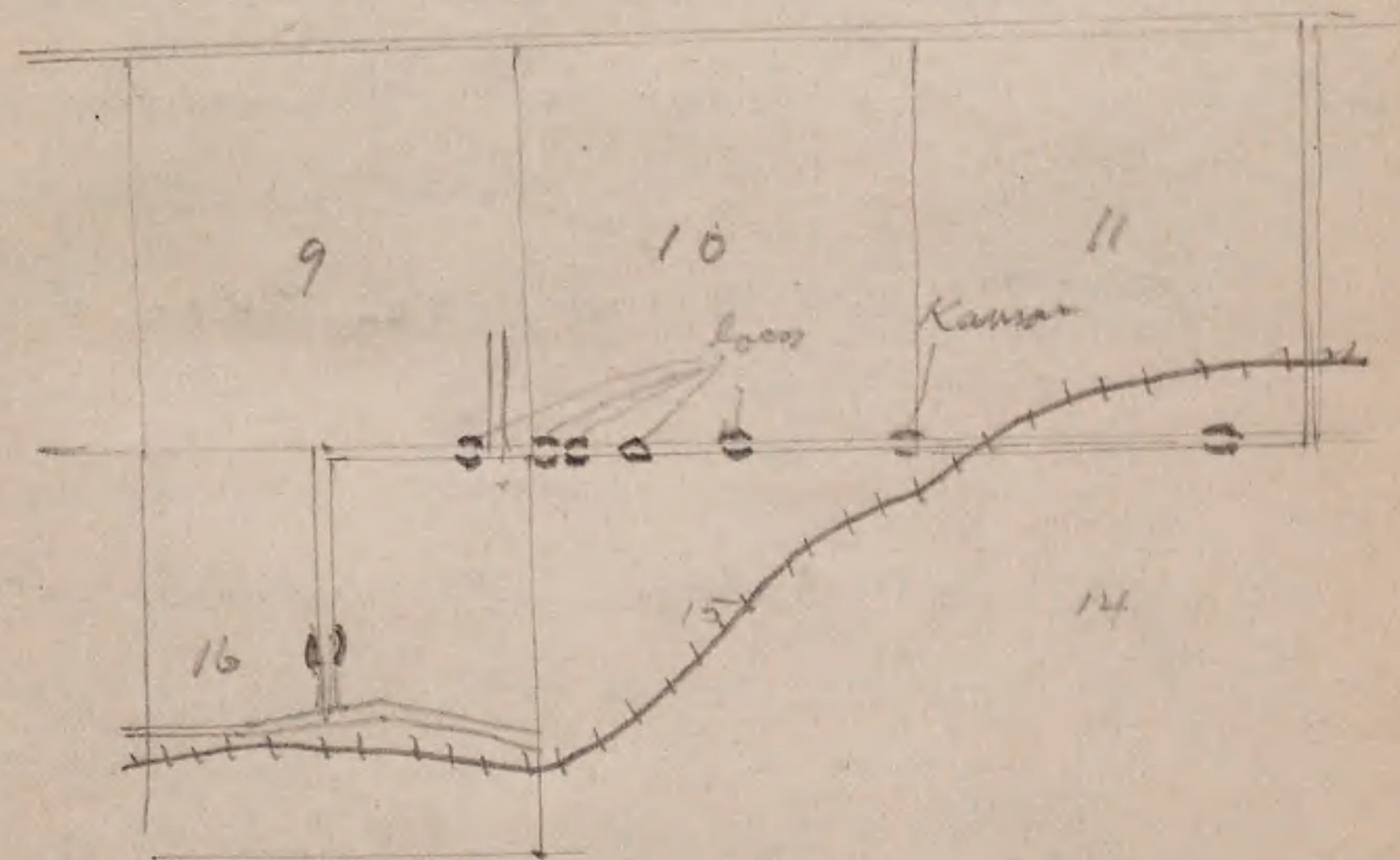


On next slope west (at X)

Kansan, with 1-2 ft  
blue loess (iron tubular) &  
over it yellow loess.  
This on slope facing E.

Next valley, about  $\frac{1}{4}$  mi west  
shows same on slope looking  
W. & again looking E.  
On E. side the blue loess  
is at least 2 ft thick &  
sharply shrunken (oxidized) from  
top.

This is only a few rods  
E. of a road running N.  
just W. of this road a slope  
down to W. shows nodular  
yellow loess, then yellow  
loess, then blue loess &  
below (near foot of slope)  
Kansan drift.



In 16 - at out, - Kansan, blue & yellow  
loess, again show on steep slope,  
yellow loess nodular above.



Aug. 20, 1910 (Saturday) 33

Left Canton at 4:30 am. for  
Rock Valley.

Drove from Rock Valley to Down.  
much of the way on a second bench  
with sand & sometimes gravel in  
the road.

There are low rounded hills  
E. of bench.

L. McGarry - well-digger.

Met Mr. Henry Kahl who  
showed us the track (which we  
purchased & shipped) and also  
took us to the pit from which  
it was taken.

This is south of the Great  
Northern depot and is an  
immense thing.

The tracks (there were two, several  
yards apart) we found at a  
depth of about 35 ft. One was  
destroyed & partly loaded by the  
steam shovel. Of the other 7 1/2 ft  
was recovered by Mr. Kahl. He says  
it was 10 or 12 ft long.

The bed is made up of cross-bedded  
sand & gravel. There are some  
iron streaks and occasional lines



and bands of MnO<sub>2</sub>.

A few very large boulders have been found, 2 of them were near the tracks. Shells of *Sphaerulites*.

The gravel is washed & mixed stuff, some dark, some fine O. Occasional bits of granite (rotten) occur.

A second pit (smaller) is north of the depot. In this the stratum is the same but a few fragments of *Sphaerulites* were found.

The sections both have Aftonian aspect.

Interviewed Mr. McGarry.

He said on second bench there was usually 35-40 ft. of gravel. Less in places, & in one place he went down 65 ft. in silt & struck cotton-wood hay.

Says on hills there is "hardpan" (Kansan) & loess on top of gravel. Says he sometimes finds a dark blue clay (tough) below gravel. Sometimes a tough yellowish clay in same position.

35  
From a well in Doon, on bench, he took bone (see spec.) at a depth of 16 ft. The bone has Aftonian aspect. He also showed a piece of Cretaceous rock with *Dromaeosaurus*?

Returned to Rock Valley. After lunch visited pit at N.E. corner of town.

This shows about 15 ft. of cross-bedded (beautifully) sand & gravel (fine). It is located on second bench.

Found a few fragments of *Sphaerulites*.

There are a few streaks & bands of MnO<sub>2</sub>.

Packed truck & left on freight at 4 P.M. for Canton.

Took photo of big pit  
25 & 26 (?)



Aug. 21, 1910 (Sunday).

Spent forenoon in writing,  
Went to Book for dinner &  
visited all P.M.  
Read proof evening.

Aug. 22, 1910 (Monday)

Took a trip up the Big Sioux  
on the Iowa side.

In sec. 19 above Canton there is  
a partial exposure of the terrace,  
here quite extensive and rising  
35-40 ft. above the first bottom.  
It shows a part of a strongly  
oxidized bed of gravel, evidently  
Aftonian.

In the east part of same section (?)  
is located a great slide.

Barometric elevations read as  
follows:

Big Sioux river	0
Top of first bottom	15 ft.
Top of Nebraska	65 ft.
Every distinct in upper 30 ft., lower 35 ft. partly covered - slump.)	
Top of Aftonian sand =	78 ft.
Top of Kansan =	105 "

Top of exposure, some stratified<sup>37</sup> 37  
stuff, probably slumped - 110<sub>4</sub>

This great slide is in the  
S.E.  $\frac{1}{4}$  of sec. 19-98-48, and is  
remarkably interesting. I found  
here and there from water level  
up to 35 ft. what is evidently  
Nebraskan, but as it is opposite  
the slide it may have washed  
down. But this is unlikely as the  
sand is above it, & it <sup>itself</sup> does not  
slump readily.

Then for 30 ft. more, to 65 ft.,  
there is clear typical dark  
Nebraskan (see sample). The  
upper 5-6 in. of this is  
strongly oxidized, and there  
is Aftonian fine whitish  
sand above, separated from  
the Nebraskan by a sandy  
plate (see spec.) about 2 in. thick.  
Then there are 13 ft. of the Aftonian  
sand.

The sand is separated from



The Kansan by a strongly oxidized line. Then about 27 ft. of typical bluish calcareous Kansan with few small boulders, but numerous large pebbles.

Above this is a calcareous line and above that about 5 ft. more of clayey stuff that may have been slumped from above.

There are scaly places out of lower part of sand, & the slumping of the bank is caused by the yielding of the same bed.

In the gully leading to spring and at spring in the W<sup>1</sup>/<sub>2</sub> of sec. 20. the water runs on clear-cut Nebrashian (of great thickness evidently), & evidently comes from Aftonian sand. The tops of the hills, - the upper slopes, - show plenty of Kansan at surface.

Other springs appear eastward,

and in all cases there is evidence of Aftonian.

There are also several smaller slumps, - two of good size, - and scaly places.

At the last one visited, - in sec. 20, - the readings were:

River = 0

Top of smaller slump 60 ft

Top of Kansan bank 165 ft.

Top of loam-covered (scantily) ridge = 195 ft.

Nodular yellow loam appears here (thin) in many places, high up.

Top of next high ridge (narrow) west, (loam-covered - nodular layer at surface) is 205 ft.

Also collected some plants and shells.

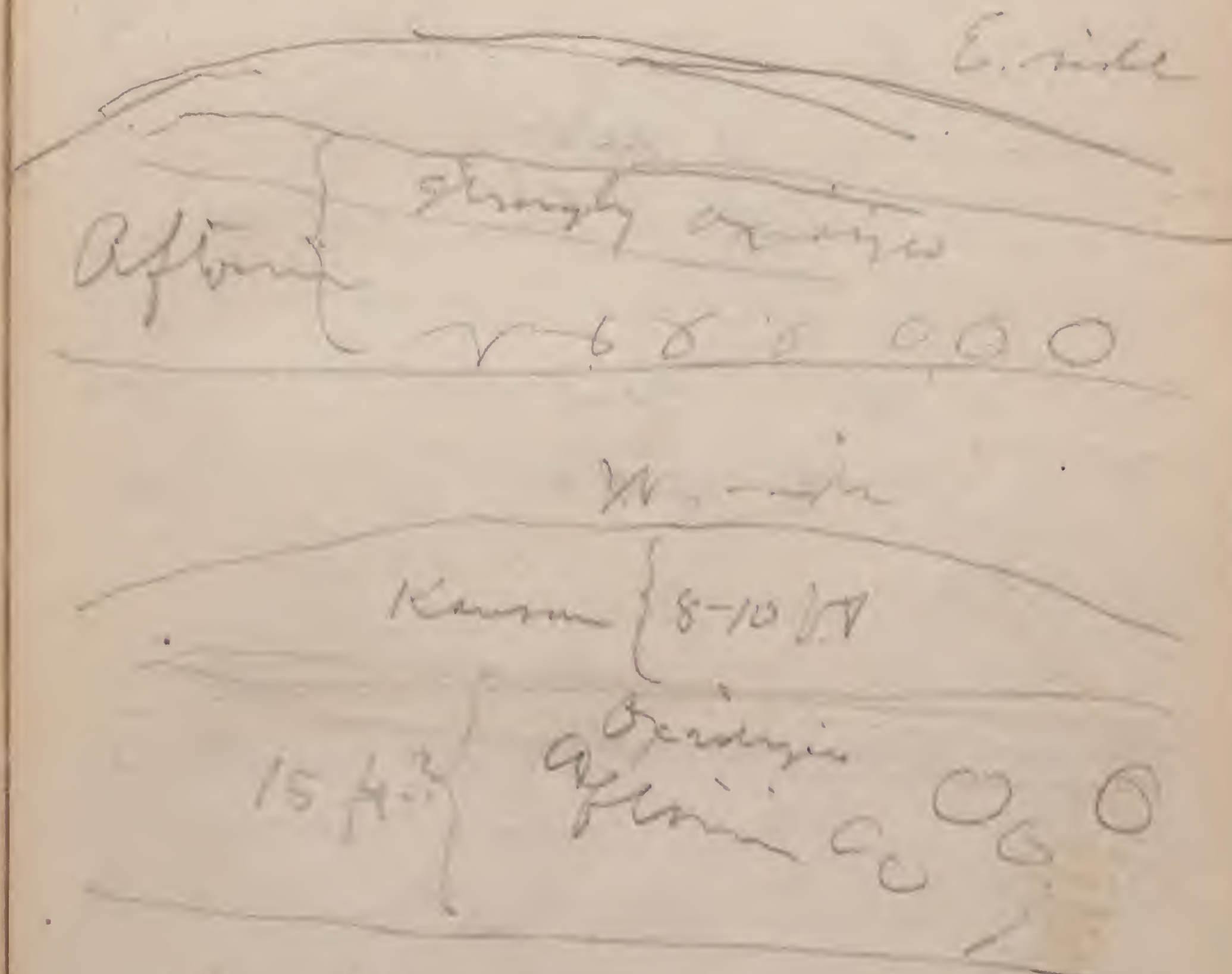
In evening when returning we were accosted by a group of 5 hoboes at the R.R. bridge. He wanted first a lunch



that we might have, then  
a nickel, then a lead-pencil,  
& then a match, and when we  
told him that we had none of  
these he exclaimed, "My God,  
you are worse off than we are,  
come and have some supper  
with us!" He offered us cold  
potatoes, roast beef & coffee, and  
some "alcohol to warm us up".  
He also thought that I was  
a doctor and spoke of my  
camera as a medicine chest.  
Charged driver in evening  
and wrote.

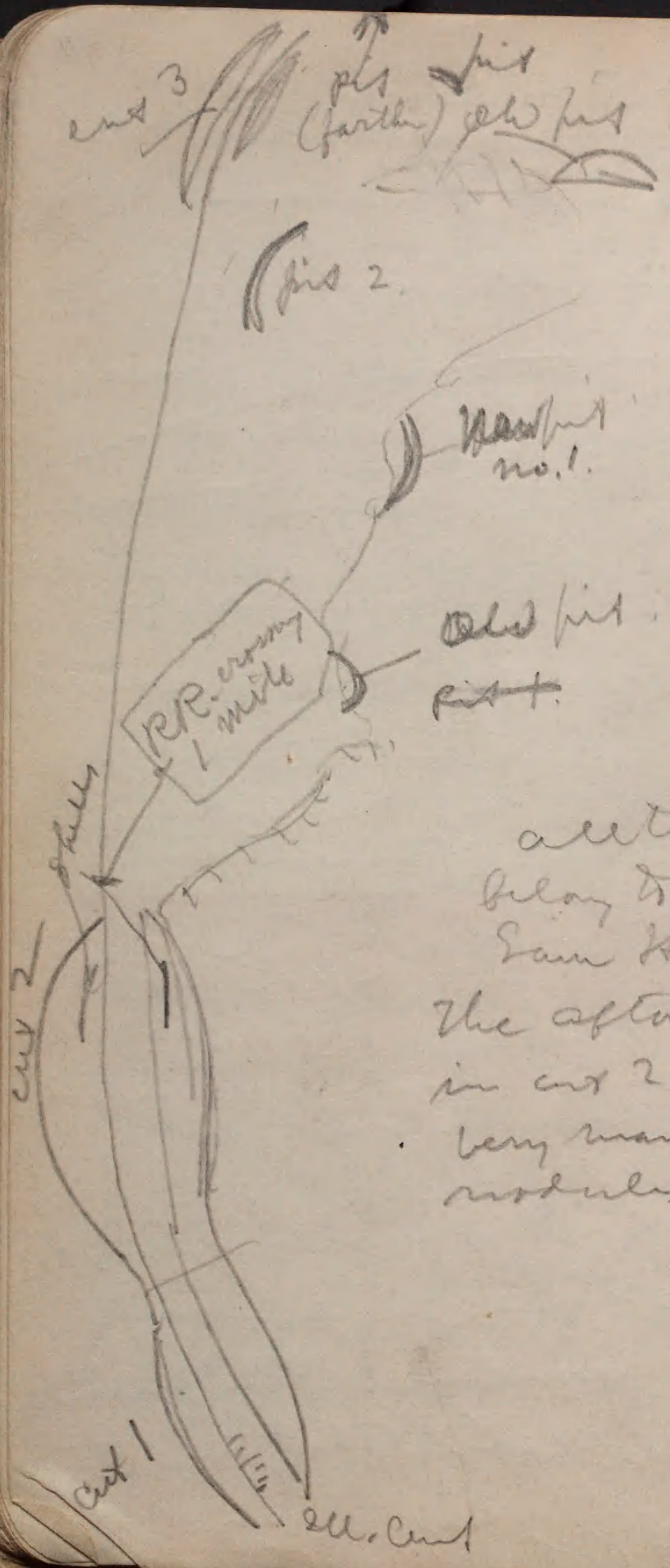
It was very smoky all  
day, & very muggy after.  
The smoke evidently comes  
from the N.E. It was strong  
enough to smell.

41  
Aug. 23-1910  
Charged driver & wrote A.M.  
At 12:10 left for Pine Falls.  
Cut along Ill. Cent.



The Karni is rather soft.  
joint clay. Chalk, with  
lower part somewhat chert.  
The Aftonian contains bones  
too. L., greenish, rather granite  
etc. The lowest part, appears  
silty (yellowish - brown)  
2-4 ft.

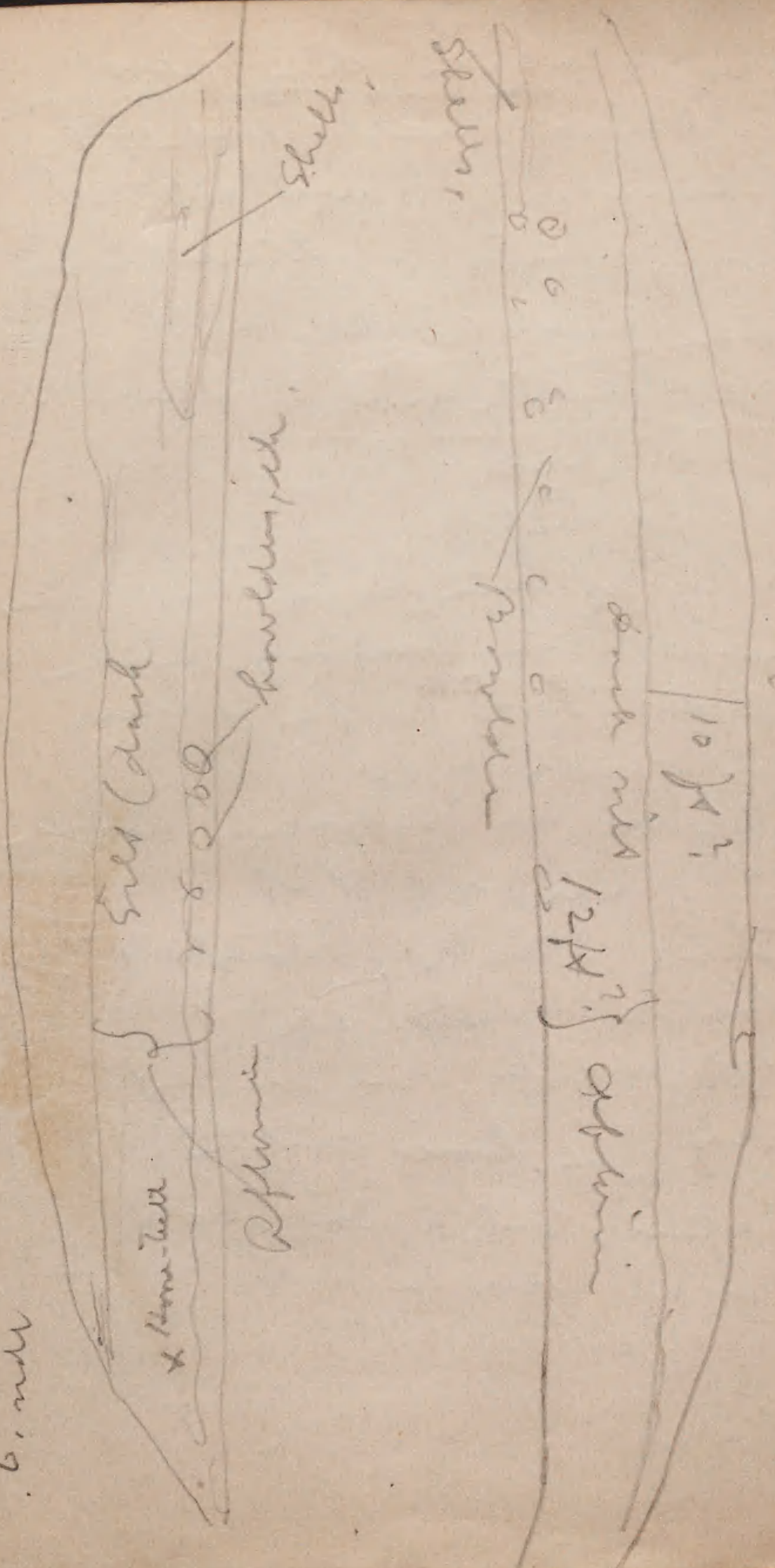




Old pit  
rest.

all the pits  
belong to  
Sam Hammon  
The bottom (silty)  
in cut 2 has  
very many small  
nodules.

(14) cut 2  
B. m. m.



(5) m. m. (silty) m. m.

shell  
silt (dark)  
no. 1  
P.R. crossing mile  
cut 2  
cut 1  
all. cut



The Kanran has <sup>and many small thin nodules</sup> few pebbles & small boulders. Remnants of bones (x 3 teeth) were found scattered along in cut 2 on both sides. The teeth & a few heads(?) bones were close together on left side.

The aptoin is in places (lower part) very bouldery, again gravelly or sandy & there is much silt.

There are calcareous nodules in lower part of it.

There MnO<sub>2</sub>, strongly oxidized belts & bands, etc.

Most of the bones in cut 2 were from loose material at surface, but a few pieces (1 or 2) were in solid material.

Pit 1

45

7 ft Typical bluish Kanran, much ferruginous

10 ft cross-bedded sand & fine gravel / expo

Workman says there is 25 ft. of sand.

The aptoin is cross-bedded more or less ferruginous, MnO<sub>2</sub> streaks & bands. Typical aptoin.

Saw no shells or bones.



*Acerates viridiflora*  
 " " *v. lanceolata*  
*Achillea millefolium*  
 Pit 2

4/8 Kansan bluish hill  
 sandy & fine  
 sand.

Sandy silts.  
 Very ferruginous  
 cross-bedded  
 fine silts  
 18 or 20 ft. of afluvial  
 exposure.

Cut 2 (silty part) yielded 97  
 the following shells:

*Planorbis bicarinatus*  
 " *parvus*  
 " *dilatatus*

*Segmentina armigera*

*Polya lutea*

" *sayi*?

*Lymnaea reflexa*?

" *capitata*

" *Valvata tricarinata*

*Amnicola* -

*Physastra sulcata*

*Pisidium compressum*

" *abditum*?

*Anodonta* - fragments.

*Valonia parvula*

*Anafus* -

Also

3 teeth - *Equus* -

fragments of bones.

Antler of deer.







The CR & P. consist of  
cross-bedded sand & gravel, mostly  
the gravel with many boulders  
running up to a foot.

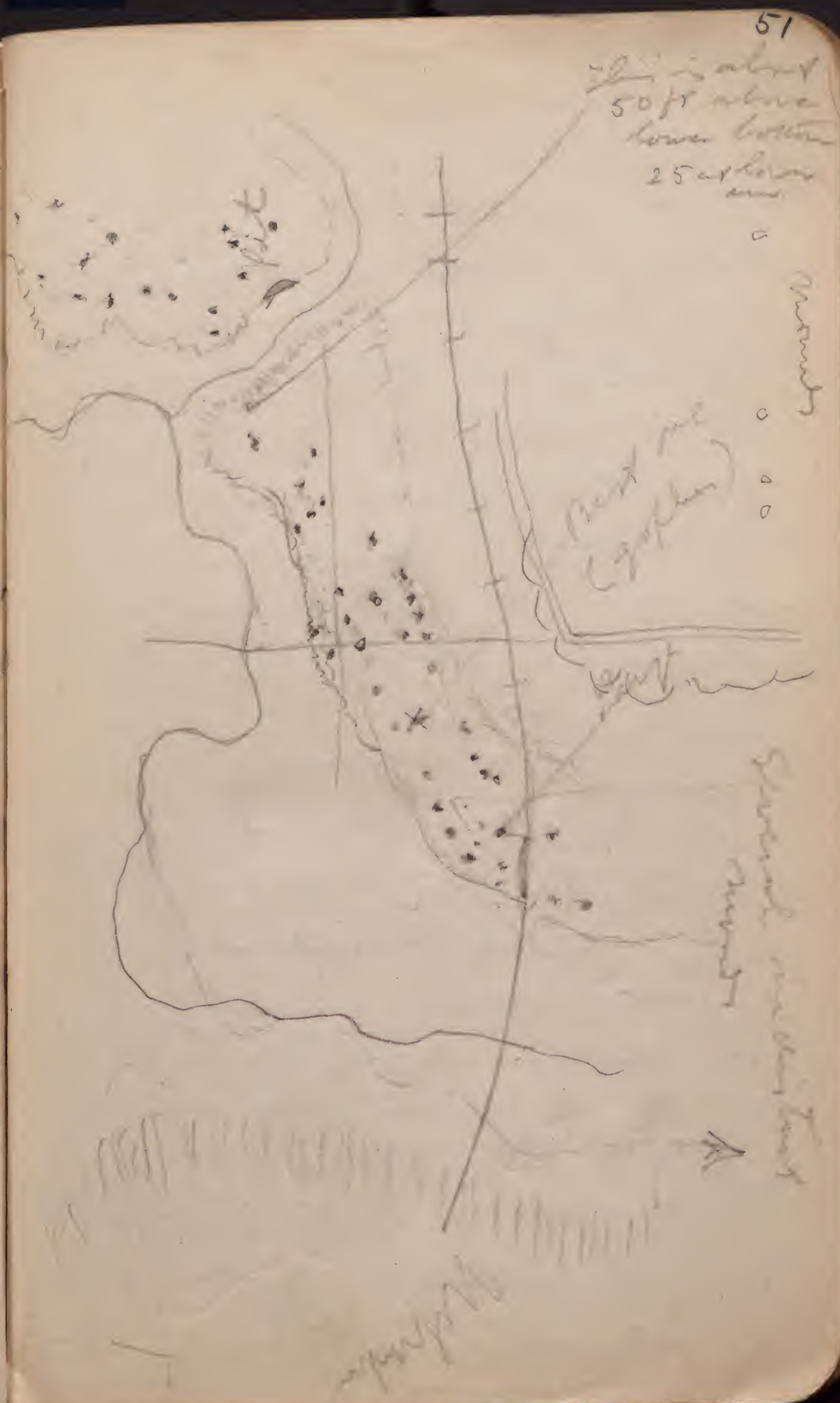
It is very bouldery.  
There are only streaks & layers  
(some 2-3-4 ft) irregular.  
The stuff looks like - ferruginous,  
with rotten granite, etc.

It certainly is afloat.  
On top there are 2-4 feet of  
yellow stuff with a few pebbles  
scattered through it. The stuff  
is like joint clay.

Now part of it seems coarse bouldery  
ferruginous layers above &  
ordinary coarse sand & fine  
pebbles below with streaks  
& bands (prominent) of the O<sub>2</sub>.

Mr. Toby Iverson who once  
owned this ranch, says that  
the big boulders were mostly  
dragged to the edge. This  
is Wilder's Moraine!

The mounds all over this &





the other side also. Mr. I.  
(+ the other farmer N. of  
pit. says the same) that  
bones, shells, etc. (hatchets, etc.)  
have been found in these  
mounds. - Much digging  
has been done in these  
mounds. There are  
Wilder's mounds!

✓  
✓  
Photos 27 & 28

29 & 30

Wilder's "mound".

✓  
✓  
Photos 9 & 10 (spoiled) view  
across toward pit.

✓  
✓  
✓  
Photos 19, 20, 21, 22  
mounds -

The plateau on which burial  
mounds are located is highest  
to the N.E. & slopes to S.W., the  
top being only slightly interrupted  
by irregularities.

There are at least 20  
of these mounds - built  
up with boulders, etc. in  
upper layer very abundant.

In one mound well to S.W.  
gophers brought up fragments  
of bone, clam-shells, pottery,  
and a human molar.

The mounds are regularly  
rounded & mostly about  
50 ft. in diam & 4-5 ft  
high.

The 2<sup>nd</sup> cut (nearest bridge)  
shows a very firm layer  
of gravel, very large boulders,  
blocks of limestone, etc.

This part is very gravelly &  
may be a terrace (?)

Under it is what looks  
something like Kansan,  
with small pebbles, etc.

It is possible that this gravel  
is Buchanan.



In the 2<sup>nd</sup> cut on S side  
 about 3-4 ft. of top is  
 very bouldery (big) & rusty.  
 Below it is a joint clay with  
 scattered pebbles & calcareous.  
 It is yellow (bluish) & is  
 evidently Kansan.

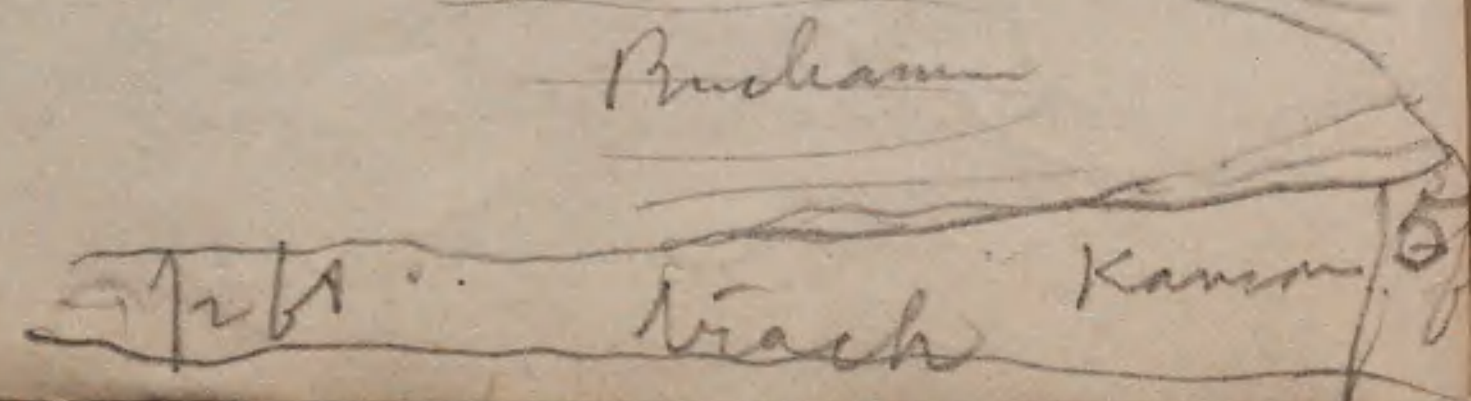
The E. end of the "moraine"  
 is fully 50 ft. above the  
 bottoms.

The gravel pit runs up to  
 about 40 ft. & the gravel  
 is about 20 (or more?) ft. deep.  
 Strata clay below.

In the pit the upper 3-4 ft.  
 is cemented, very bouldery &  
 ferruginous.

Then comes clean  
 over-bedded sand.

At S.E. end it appears  
 no i.

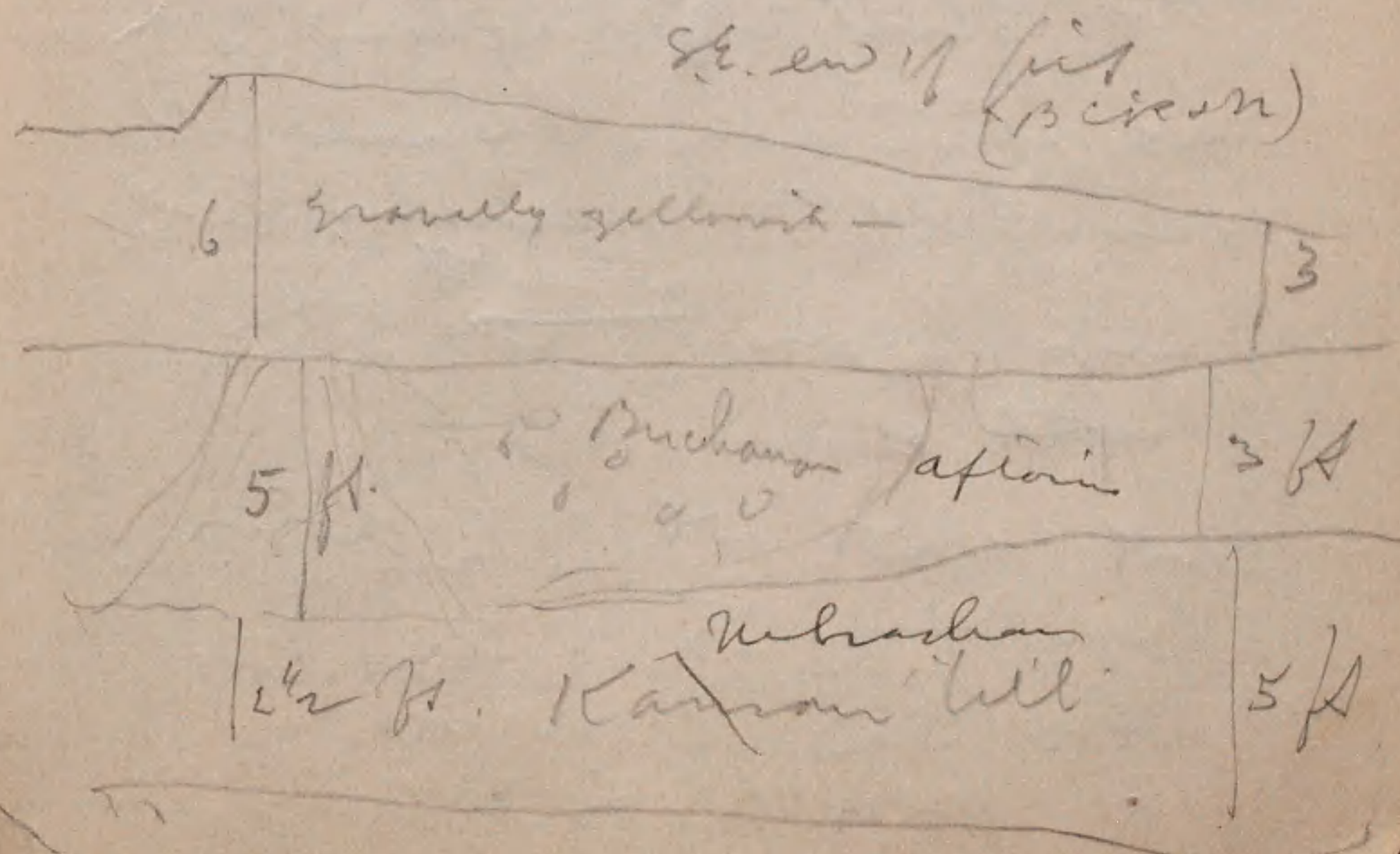


see samples of Kansan  
 I should certainly see that  
 Kansan below - has, tough  
 upper part or line reddish  
 rest darker.

Some pebbles & a little  
 lime.

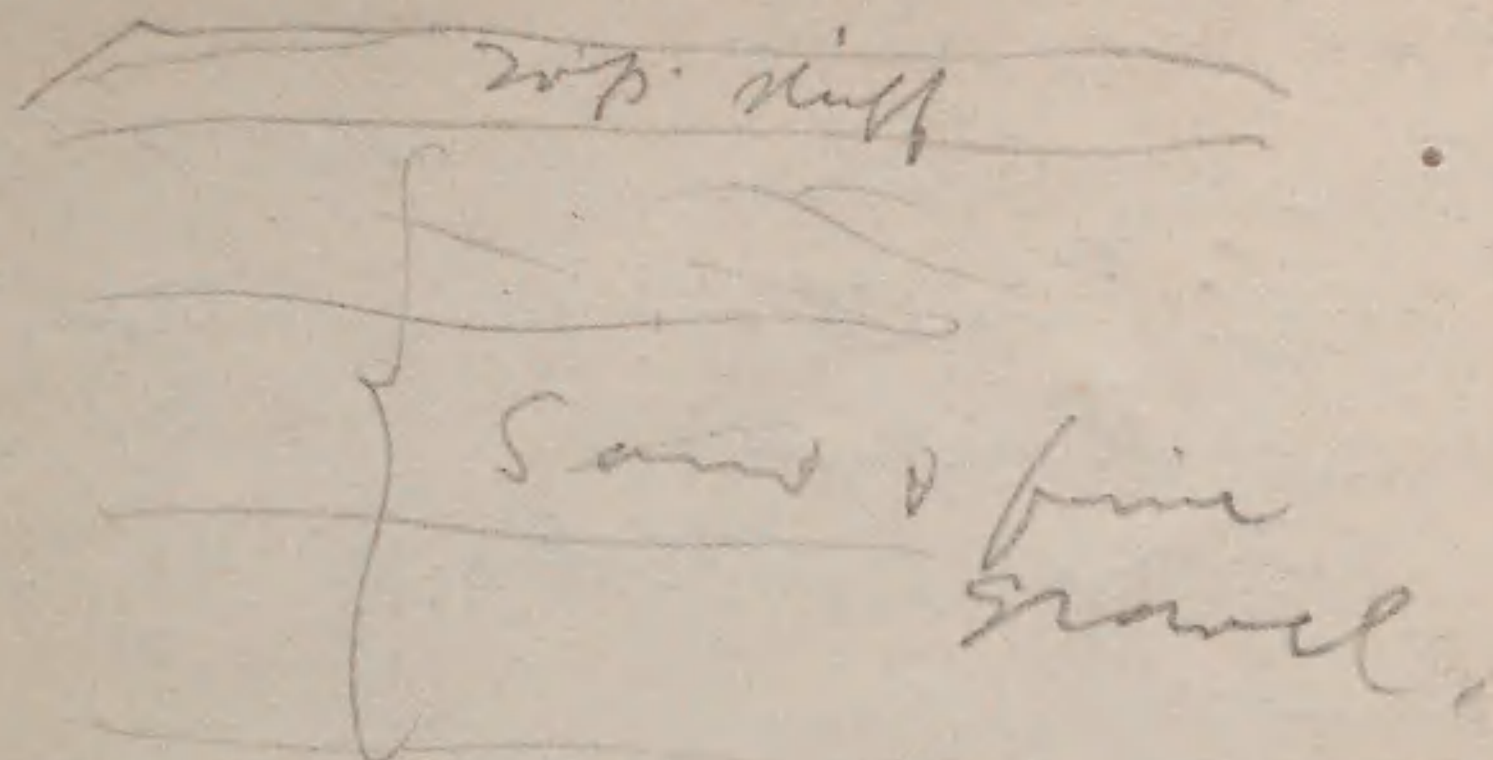
The Buchanan gravels  
 are about 20 ft. deep.

In the thicker part to right  
 (S.E. end) the Kansan is  
 crumbly - like stuff in  
 cut 2, & more calcareous.  
 Photo 15 & 16 looking E.





✓  
✓  
Pluton 11-12 Pit



begin W. on track.  
cut 2 begins at 306  
mile post, 17 poles W. of  
switch. This is also  
beginning of curve

306 mi.  
The first 5 ~~poles~~ <sup>poles</sup> lengths in  
cut show only Kanran with  
small pebbles & calcareous spots.  
Boulders begin ~~between~~ <sup>at</sup> poles  
5 ~~to~~

cut ends at 9 1/2 poles.  
Boulders to W. end.  
also end of curve.  
poles to bridge.

57  
Walked westward to bridge. The  
Buchanan terrace runs  
close to river at bridge, but  
farther down it runs &  
recedes eastward. Could not  
see clearly.

Caught up with Mr. D.H. Pratt  
on the So. Dak. side, and we  
walked to Shindler. After  
a rest and lunch, we walked to  
Sioux Falls, where we arrived  
at 9 P.M. ahead of all trains.  
While we were waiting at  
Shindler the wind (from the  
north) became very cold, and  
I was chilly.

Walking (12 miles, in addition to  
about 6 made in walking back & forth  
from the Granite pit to the Indian  
burial ground) was hard because  
of loose gravel balls.



Thurs. Aug. 25, 1910

Went to Lee Bend cut E  
of Sioux Falls.

Took photos of cut 1-8. side ✓  
✓ 1/4 mi. ✓ 1 mi. ✓  
Photos 11, 12 & 15, 16. (= 27 & 28 below)

Kansan drift

2-8-10  
Abluvium  
0-6

The Kansan is calcareous  
with small pebbles - rather  
soft joint clay, bluish &  
yellowish.

Like upper part of gravelly

Went to H. S. Hamilton pit.

Took photos 21 & 22, 9 & 10. ✓  
One ~~not~~ spoils - took 27 & 28 later. ✓  
(See next page) *Amnotherium*  
cut.

The Kansan is distinct  
joint clay, but has few pebbles.  
It has a distinct Kansan aspect.

black soil.  
bluish.  
joint bluish clay  
reddish (ferruginous)  
not blue  
Abluvium  
fine sand.

Mr. Hamilton - says the sand  
is 25 ft. to water & 3 or 4  
ft. of gravel below.  
When his well, near pit (lower)  
was put in the well - man went  
25 ft. into hard dark blue  
clay. This clay (probably  
Mankato). was exposed much  
over large area in the  
pit west (the first one off  
RR).



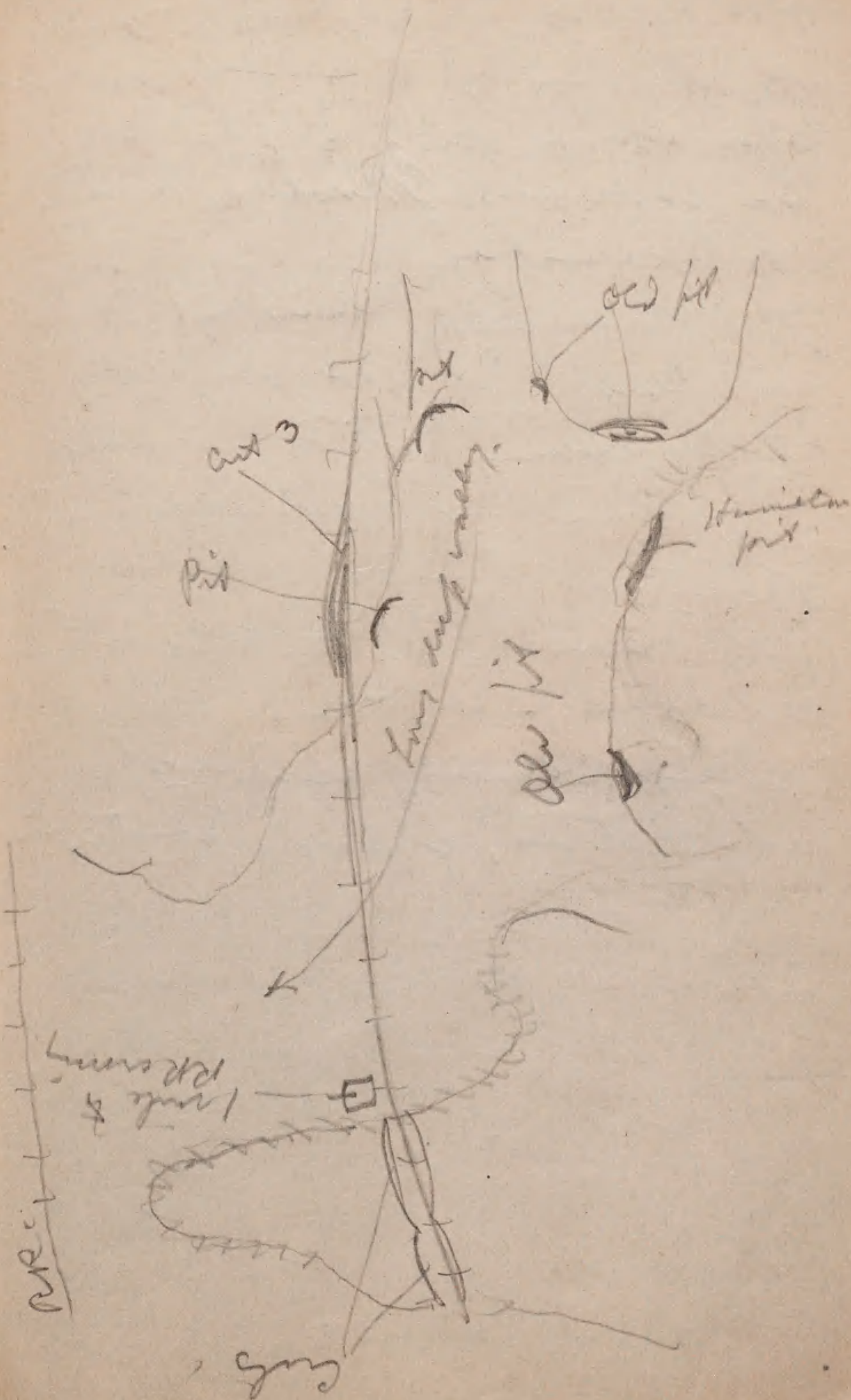
We dug down in old west pit  
 & struck a hard, dark stuff  
 which is regularly stratified  
 (see spec.) evidently water laid.  
 It shows a few pebbles.  
 This pit had about 8 ft. of sand  
 & gravel, & the lowest foot was  
 largely made up of boulders  
 from 6-12 in. in diam. A big  
 heap of them is nearby.

I estimate this Alton  
 in east 1/2 on Ill.  
 Cent about 50 ft.  
 above river valley

I collected several hundred  
 shells in art 2, in the  
 east (silty) end.

S. E

61





The great mud fires made it so smoky that I could not take longer distance pictures. This continued Monday, Tuesday and Wednesday.

This morning (Thursday) it was clear. It got very cold in the evening, while we were at Shindler yesterday.

Returned to hotel at noon, took dinner & then at 12:55 left for Canton.

Changed dress, read proof, wrote letters, changed plates, etc.

Aug. 26 (Friday) 63

Took team from Simon-Ullrichson barn & drove to Fairview. The bluffs on the Iowa side below Beloit in Lyon co. are rounded, with rather gentle slopes, & except where there are a few deeper pockets with tree-wood groves, they are prairie. Took photo of pit - 24 x 30.

Looking N. E.

The pit shows even bedding. The ~~engineer~~ <sup>steam shovel</sup> ~~operator~~ <sup>operator</sup> of the gravel pit said that there are about 30 ft. of gravel.

At the base - on floor of pit - we exposed a reddish laminated tough clay exactly like that near Hamilton pit at Des Falls. This is about 5-6 in thick and then comes a tough, rubber-like, blue-black clay with pebbles scattered through it - mostly dark colored pebbles. There are also pebbles



in the other yellowish part.  
This upper part is distinctly  
stratified & laminated.  
The beds have streaks of  
gravel, & wedges of sand, -  
cross-bedding is fine.

The men say they find "boulders"  
of this same dark stuff through  
the gravel.

Rotten granite boulders are  
common.

Just now they are working 32 ft.  
deep.

A big well along main line of  
RR. was sunk 40 or 50 ft.  
into the Nebraskan & was  
given up.

The stuff is all Nebraskan.  
Picked up two glacial pebbles.  
(one them.)

The RR. track (main line)  
is about same level as  
top of Nebraskan in bit &  
this is top of this  
on well.

The lower river bottom is  
about 8 ft. lower than well.

65  
Photos 1 & 2  
Looking E. at Iowa side  
from 1 mi. past S. of  
Fairview

Photos - 21 & 22 - (front lens out)  
Looking NW. toward wooded  
bluffs on Fairview side.

Photos - 29, 30 - Same (both lenses)

Photos - 27, 28 - Looking toward

Iowa side from same place.  
The bluffs on the Iowa side  
E. of Fairview are quite rough,  
somewhat timbered & rise 215  
ft. above the RR.

All the hills along here are  
more or less bouldery on the  
sides, and all is Kansan.

Some to wooded hills above  
Bellevue (spelled)

Photos 15 & 16  
Looking S.W. along timbered bluff

Photos 25 & 26 - N. from  
same pt. (front lens out)

These were taken from top of  
last bare knoll 95 ft. under the  
other bluff. Next is looking E.



from same point.  
33 & 34 2 views of  
timbered valleys.

Aug. 27-1910 (Saturday)<sup>67</sup>

Drove toward Klondike with  
Mr. J. E. Carman.  
The great mound N.E. of Canton  
is undoubtedly Kansan - a  
big hump.  
North of this small cuts in  
road & gutters show sand &  
gravel up to within 2 or 3 ft.  
of the surface. This 2 or 3 ft.  
is made up of a brown surface  
soil (somewhat sandy & pebbly &  
a little like joint clay, & under  
it a rather soft material, about  
a foot or so thick with numerous  
lime nodules. This is as it appears  
in a <sup>gutter</sup> cut along road near township  
line N. of mine. (This is really  
about  $3\frac{1}{4}$  mile N. of top. line)  
near N. line of the 1<sup>st</sup> sec. north,  
at creek S. of school.)

At S.E. corner of sec. 19 on  
the Mainbridge (Honey Mountain) place  
the cellar  $4\frac{1}{2}$  - 5 ft deep did not



penetrate to gravel.  
The material banded  
out in a tough more or  
less joint clay with  
many pebbles. It is  
calcareous & with numerous  
iron streaks, etc.

I should call it Kansan  
a shallow well 4-15  
ft. deep nearly goes  
into gravel.

A gravel ridge in  
conspicuous shows gravel  
at surface.

A cut in road S.E. of  
house shows about 3  
ft. of the same.

Kansan with very much  
calcareous nodular material.

N.W. from here Mrs. Prainbridge  
says they can drill a well  
on account of boulders.

This is on quite a swell  
in the plain. This runs  
up until the gravel plain is

69  
reached. This is evidently a Kansan  
plain.

Just opposite Klondike, N.S.  
side of road a house sits on  
terrace. The upper part is  
sand & gravel (the owner says  
a foot or two of soil) & under  
it is a plain line of Nebraska  
(about 1/2 of terrace) & water  
runs out from above this  
all along.

The surface is now overgrown,  
but the owner says they dug  
a shallow well on the side &  
got into dark material too  
hard to work with a bucket.

The gravel as exposed along road  
just N. & is very ferruginous,  
cross-bedded, etc.  
the terrace is about 25 ft. above lower  
bottom. 10 ft. of upper  
15 " - Nebraska.

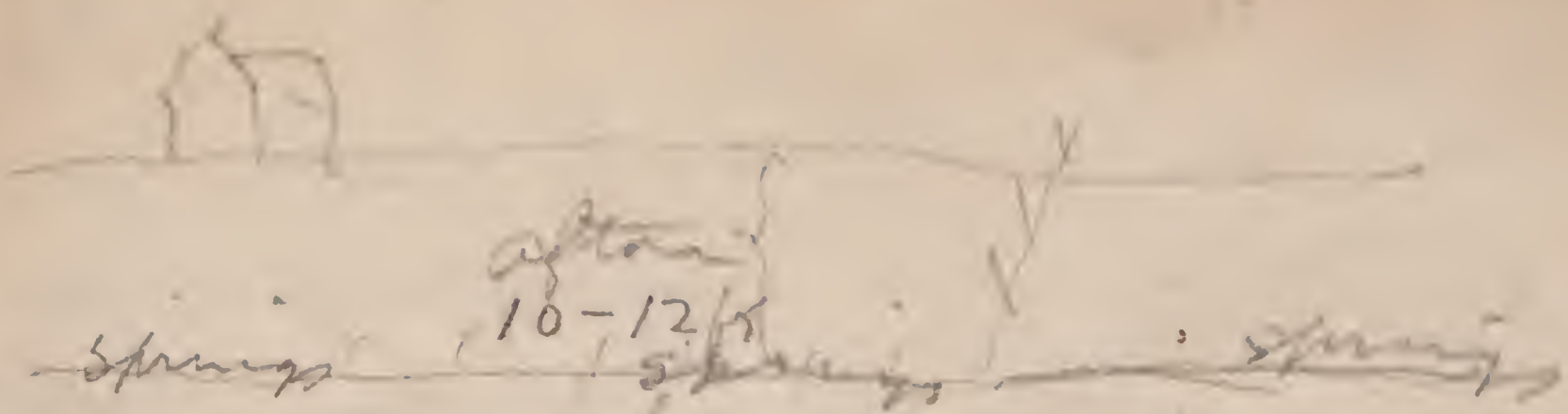


On the north side of the Kansan  
 Look there is a cut just back  
 of the Peterson barn, there is a  
 bank where an old barn has  
 been located.

Here typical Kansan, bluish  
 joint clay, very calcareous, strewed  
 ferruginous, with pebbles, —  
 lies over a bed of aptoma  
 sand & gravel. At line of  
 contact they are more or  
 less mixed.

The top of the aptoma  
 (as exposed) is about 20 ft.  
 above the lower bottom, &  
 this is about

The upper part of the Aptoma  
 is rather fine gravel & sand  
 cross-bedded - & otherwise typical



Nebraska 10-15 ft

Photos 7 (8 spots) & 9 & 10

Photos 11 & 12 - more distant  
 view of same

In the  $2\frac{1}{2}$  of sec. 1-99-49  
 the bluffs are very rough, high  
 & come right to river.  
 At foot of a sand slide I found  
 (some time for 12 or 15 ft. (it  
 was probably broken) a bed of  
 crumbly, hard joint clay, quite  
 dark & iron stained somewhat,  
 probably Nebraska - down to  
 water's edge.

Resting on bottom 1050  
 11 ft top 1225  
 175 ft

The terrace up toward granite  
 ridge is more or less broken, then  
 south it appears very distinct on Nebraska  
 side.



It is 140 ft. from lowest bottom  
(about 145 from river) to top of  
Aftonian.

Above the Aftonian typical  
Kansan extends up to the  
top with a little coating of  
nodular loess.

There are springs here.

We found <sup>the</sup> black Nebraskan  
up to 65 ft & the yellowish  
stuff up to 80 ft.

Water comes out at about 730  
which appears to be Nebraskan  
shown at 125 ft.

Just N. at house on N. side  
of the ridge there are numerous  
springs at a much lower level -  
scarcely about 30-40 ft above  
lowest bottom. Above this  
seems to be a lot of  
Kansan.

Over N. toward school-  
house.

(The big bluffs where high up  
Aftonian was observed are  
similar to those below Churdick,  
above Canton, etc. & are  
rougher & higher than usual.  
These places represent unusual  
lands of drift.

On the S. Dakota side the  
plain comes down gradually  
toward river. Did the  
ice slip over this & flow  
up down side?

The probability is that  
in this ridge the Nebraskan  
and Aftonian were placed  
upward, for the springs  
on the N. side are at  
a very normal level,  
much lower than those on  
the ridge.



at mts. av. N. side of  
no 36-100-419 - just  
E. of school there is a fine  
white gray silt under  
The top of higher level a few  
rods E. shows quite a layer  
of nodular loam - yellow  
On the third (lower) ridge  
(about  $\frac{1}{2}$  mi. E. of school (a  
triple level -  $\frac{1}{2}$  mile is a few  
rods E.) a blue loam, very  
many nodules shows, &  
above it yellow loam with  
nodules  
The gutter N. (deeper) shows  
the yellow loam (especially  
below) laminated with  
strata of sand.  
Next ridge (just E. of  $\frac{1}{2}$  mile)  
is the same - 2 courses, etc.

Between 32 & 33 - 54 - in  
Simp. Dwp. There is a small  
pit on W. side of road with  
gravelly clay above.

75  
Just S. on ridge - Hill N.  
of Dwp. level there is yellow  
nodular loam on top  
Between no. 8 & 9 - <sup>99-48</sup> Centennial  
Dwp. - on first hill N. of  
bottoms there is yellow  
loam (nodules above).  
This is a half mile north  
of Henry, Lauckman's place.  
Drive to Klondike and  
down to the bluff on S.  
side of the creek, which  
rises much higher than terrace  
and is a part of the great  
heap of ridges south of the  
creek.

There is here quite a land slide,  
indeed two of them on N. side.  
The one nearer the point shows  
about 15 ft. of <sup>(see sample)</sup> Nebraska (not  
all distinct); 5 ft. of a calcareous  
<sup>(see sample)</sup> soft deposit, probably alluvium.  
This is undermined & washed out



under a great ledge of  
Aftonian conglomerate which  
is about 5 1/2 ft. thick.  
Above this is cone Aftonian  
sand & gravel about 24 ft.  
Above this Kansan shows  
clearly and runs 15 ft. to  
top of exposure.

The Kansan is typical  
bluish joint clay with pebbles,  
iron tubes, & calcareous.

The top of Aftonian has  
18 in. of a sandy fine silty  
then sand & loose gravel down  
to conglomerate.

Fine springs come out below  
conglomerate.

The large slide E. shows  
Kansan up to 40 ft. in  
thickness. It is here much  
mixed with sand boulders  
& sand-lenses, & thus  
evidently done some great  
blowing.

Aug. 28, 1910 (Sun.) 77

Between 36 & 31 N. of road gravel  
runs nearly to surface.

Started out at 7 am with  
Mr. Carman & drove in  
search of his note-book &  
incidentally my pen. Found  
former but not latter.

99-48

Near N.E. cor. of sec. 16, <sup>Continental</sup>  
Wp - on first step or hill, there  
is a mass of fine sand 6-8 ft or  
more - It is almost like loess in  
appearance, but is fine sand.

First hill north of river shows  
nodular loess with drift on  
the north slope lower down.

This is between sec. 9 & 10.  
On the next slope just N.  
there are at least 6 ft of yellow  
fine exposure, nodules above, so below  
is a bluish loess with numerous  
large ferruginous tubes & clow-ups.  
Just N. of corner (between sec.  
31 & 34) yellow loess (nodular) & Kansan.



for - (3 g granules) (common)

there is a hole in a side of  
such good and 40 feet 2. if

near at least two meters  
of dark material (carbonate)

forming will now show but  
the quartz part of the

extreme is far more, but as  
with part with Kanian

the Kanian is now are water  
1 the whole thing from the

appearance of having been  
groups of leaves

the top of the trunk-like  
irregular (primaries to them

in the neighborhood of the  
faintly put, is 35 ft

above the surface of the  
at a distance of 100 ft from the

the top of the trunk-like  
parts are up gradually

into sparse Kanian layers  
the are covered with what

is certainly Kanian, but

thing in the lower part  
large granules are visible  
here and there on the top.  
The P.R. (C.R. 100) at  
occurring in 10 ft layers  
than fine of shale, a the  
can of out at about 100 ft  
is common.

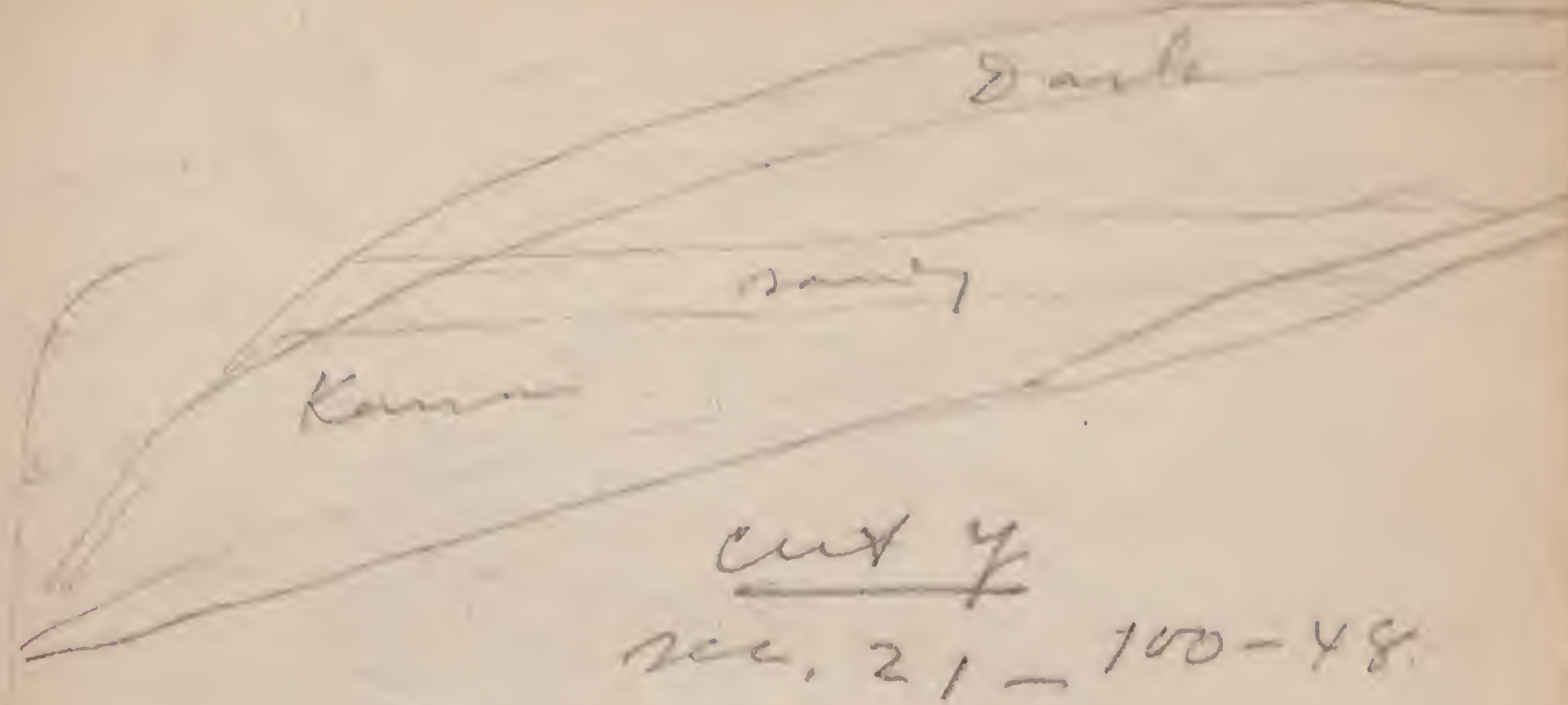


See figure 2<sup>nd</sup> page when  
follows creek. Found bench  
about 60 ft - first tongues  
of Kansan.

All the sections show Kansan  
dark below (took sample from  
cut X). More weathered above.  
at one point in the lower  
part there are what appear  
to be pockets of sand.

In cut on N. & S. road there  
is typical Kansan up to 35  
ft. & then a <sup>nearly</sup> horizontal  
layer of sandy limestone  
thick about 2 ft, & then  
a rather dark joint clay  
2 to 6 ft. — see figure

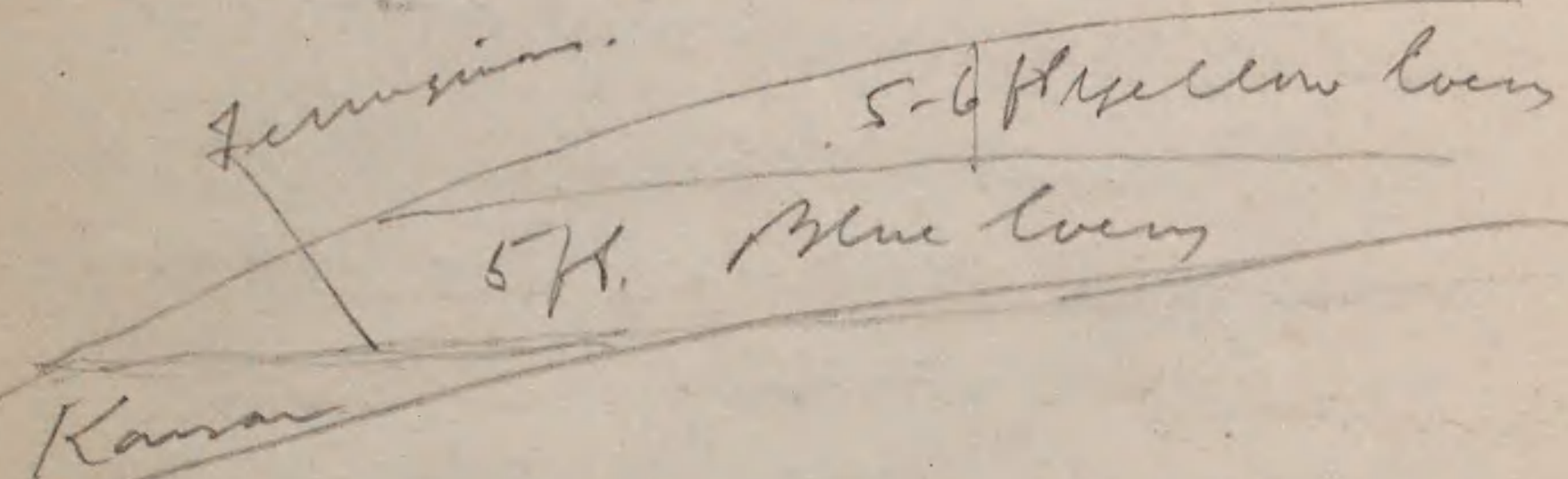
Top of "bench" or terrace  
is 46-50 ft.



at 2 (next page) there is  
a slide 20 ft high  
the lower half or more  
shows fine sand as in  
1<sup>st</sup> cut of this series.  
some above - <sup>slimier</sup> ~~slimier~~  
This is in a small down  
terrace of the Kansan  
tongues run up gradually  
there are a few boulders here,  
the gravel (mixed) run  
almost to top of exposure



upper yellow loess, with nodular  
layer, is about 5-6 ft deep.  
The blue loess shows below - at  
least 5 ft., - large iron tubes,  
few nodules.



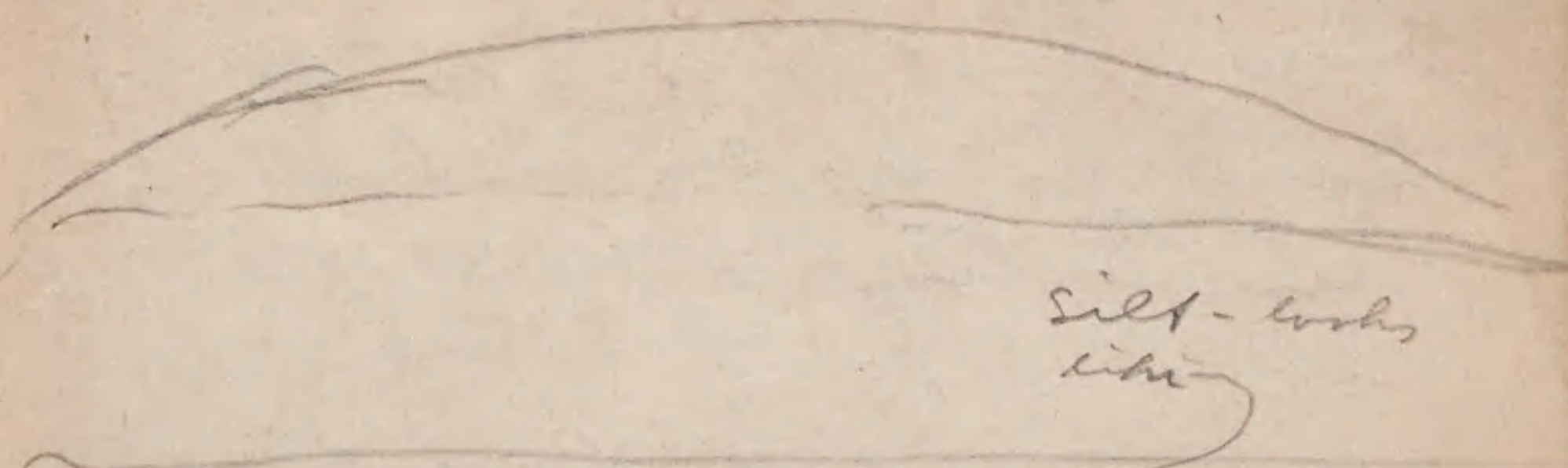
There are several banks  
and hummocks of gravel  
along this valley which are  
more recent (probably) than  
the Aftonian. They represent  
reworked materials.

Such are probably cut N. of RR.  
in N. 2. cor. of sec. 20, the gravel  
pit in 8 1/4 16; cut N. on N. side  
N. 21; and cut 2.

But at slide in 22 the mixed up  
Aftonian seems to go under sand.

1<sup>st</sup> cut N. of granite

85



weathers Kansan material but  
horizontally stratified + breaking  
along these lines.

Occasional horizontal sandbars  
at least 5-6 ft deep.

Above it a band of mixed  
gravel - 1-3 ft. or more +  
then sand + sandy soil  
(dark.)

The lower material is surely  
not Kansan.

Drove to bridge N. - Here, on  
S. side of bridge - there is  
a little plateau - seems to  
be part of a bench - with  
what appear to be Kansan in



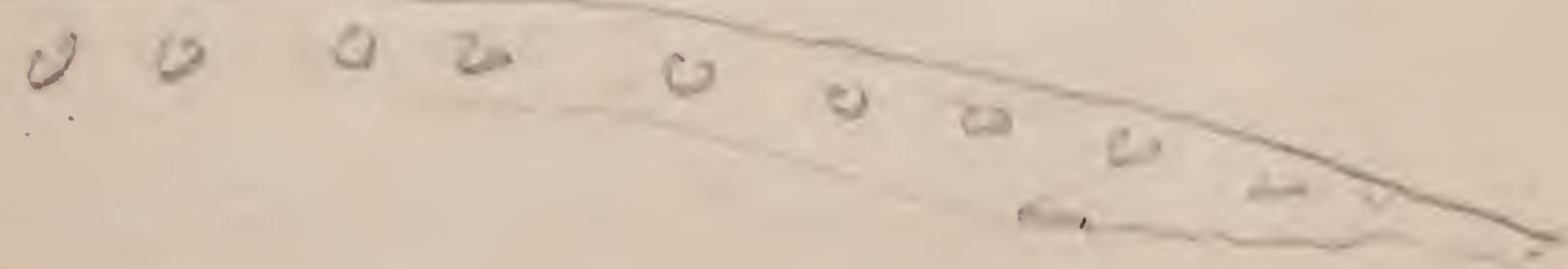
the lower 20 ft (above  
bridge) and there is mixed  
gravel on top. From base  
of this to highest part of  
plateau = 15 ft.

The gravel pit - a bank - along  
W. side of road W. of bridge  
shows sand & gravel, more  
or less cross-bedded, etc.  
The top of the gravel bank  
is exactly on a level with  
general terrace & with  
block S. of bridge.

The gravel is approx 15 ft.

The RR. at crossing S. is only  
about 5 ft. above floor of  
bridge, which is nearly on a  
level with lower valley above.

87  
The first cut S. of RR.  
shows typical Kansan  
below, & on it, following  
slope somewhat, a layer of  
boulders, etc., only about 2 ft  
thick.



The bouldery layer does not  
contain sand & gravel, & may  
be just a segregated line of  
boulders.

They are on a level with the  
general terrace as it appears  
W. of bridge, & a little lower  
than part S. of bridge.

The 2<sup>nd</sup> cut shows Kansan diff. <sup>close to</sup> 1<sup>st</sup> cut  
3<sup>rd</sup> cut S. (higher) shows yellow  
loess (nodular above)

The 2<sup>nd</sup> section <sup>on road</sup> (S.) of the same - shows  
blue loess with large iron tubes - under



6 or 7 ft. of yellow loam  
(under above)  
We found fresh roots in  
these iron tubes.  
See sample of blue loam  
1 ft below its top.  
Sample of yellow loam 4 ft  
from top.

---

Went W. Towns pit.  
Opposite a point about 500  
ft. E. of switch there is  
a dump which shows Kansan  
(quite characteristic, yellow & bluish,  
with pebbles, limst & iron) —  
up to 30 ft. above lowest  
bottom (3 or 4 ft. above creek)  
and then above that is mixed  
gravel which extends to 45  
ft. above creek bottom.  
This is about top of  
great bench, it may be  
5 ft. higher in places.

89  
The Kansan(?) — the pit  
dips about 2 ft to NW.  
The last cut at its  
east end shows a yellow  
silt like stuff with many  
nodules (reminds me of the  
top layer N. of R.R. E. of  
Grainville) and it has lens  
of sand & gravel in it.

On S. side there is a  
belt of hard salty stuff,  
looks like an old soil.  
There are a few pebbles  
scattered on the surface.



E of Nicholson bridge  
 gravel pretty well up  
 with silt under  
 just E. of bridge a  
 gorge in hill shows:

1. Kansan above -
2. an oxidized band 6-8 in.
3. fine Aftonian sand  
20 ft.
4. Nebraska Trough (see  
sample. Much

Spring come over it  
 100 ft from end.

50 ft to top of  
 Aftonian

from lowest river bottom.

A fine fan of Aftonian  
 sand has been washed down  
 on the flat by the stream  
 cutting hill.

Drove back to Canton.



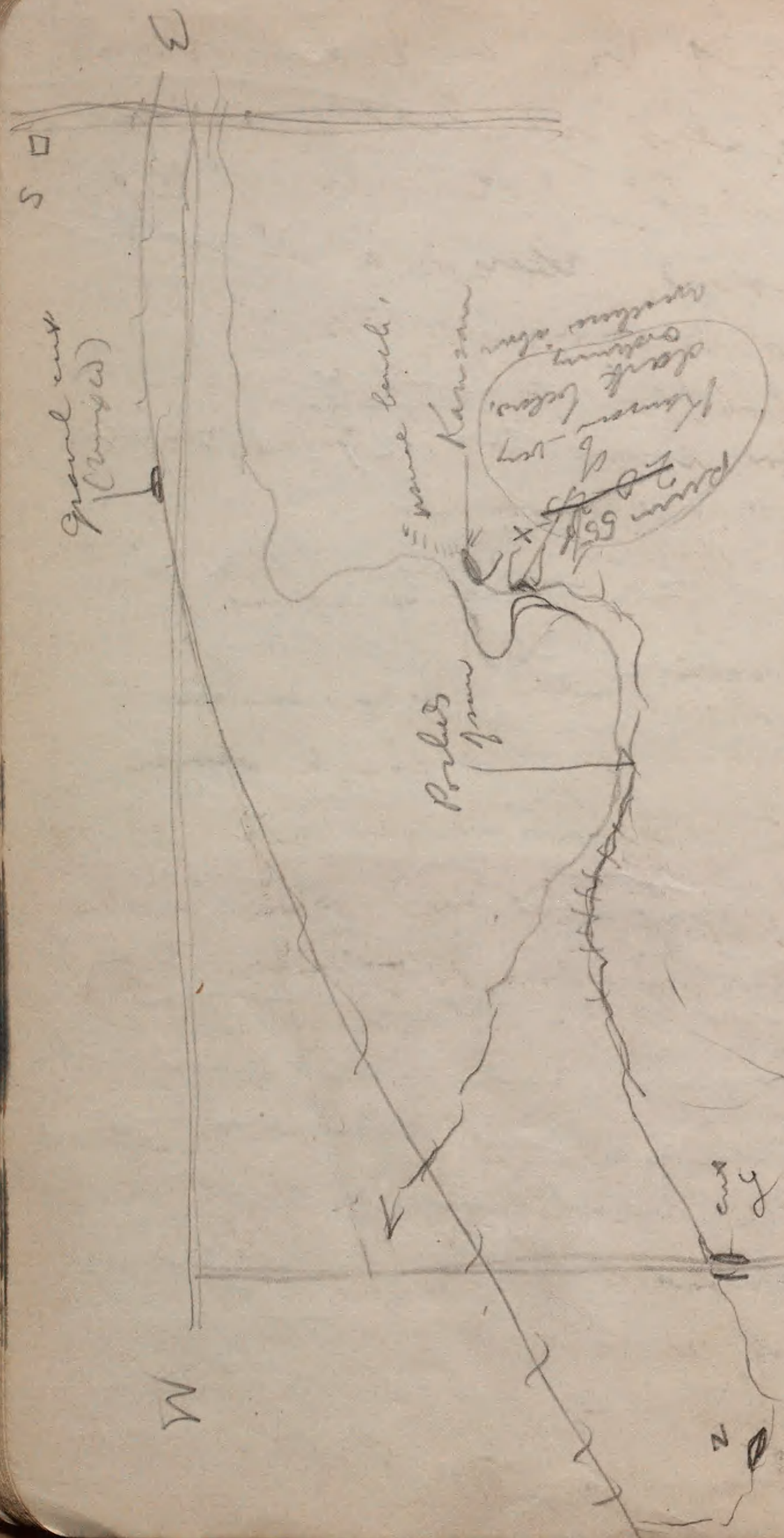
Geol. Survey, 1910

Aug. 14 - Fare to Cedar Rapids	.50
" 14 - " " Larchwood -	5.94
mon " 15 Breakfast, Hotel Orleans	.50
Lodging, Larchwood Hotel	.37 <sup>1</sup> / <sub>2</sub>
" 16 - 3 meals & lodging " "	1.50
" 17 - breakfast + lodging " "	.75
Dinner <sup>25</sup> home-fed <sup>25</sup> J. M. Blue	.50
Lunch (supper) Larchwood lunch room	.20
Livery	2.00
Lodging, Larchwood Hotel	.37 <sup>1</sup> / <sub>2</sub>
" 18 - Breakfast + dinner + supper	1.12 <sup>1</sup> / <sub>2</sub>
Livery	1.50
RR. to Sioux Falls	.50
Transfer " "	.25
Dacotah Hotel " " lodging	.50
Tue. " 19 - RR. to Canton	.63
Team to Klondike + feed	3.50
Breakfast + lodging, Rudolph Hotel	1.50
" 20 - RR. to Rock Valley	.47
Lunch - lunch room (breakfast)	.20
Team to Orion	1.50
Lunch room - Rock Valley	.28
RR. to Canton	.47
Supper Rudolph Hotel	.50
Lodging " "	1.00
" 21 - Breakfast, supper, lodging	2.00
" 22 - " lunch (supper) Gate City Rest	.20
" 23 " dinner " "	1.00
RR fare to Sioux Falls	.62
Dry plates - 4 boxes -	2.60
Sioux Falls	.50
Hotel Dacotah - room	.50
Lunch - Boston Cafe (supper)	.25

93

Aug. 24 -	
Breakfast (Boston Cafe)	.25
Lunch (for room) " "	.25
RR. to Granite	.36
(Return	.36)
Lunch (supper) grocery, Shindler	.20
Lodging - Dacotah Hotel, Sioux Falls	.50
Aug. 25	
Breakfast + dinner " " " "	1.00
RR. to Canton	.62
Telegram + night letter to Calum	1.00
Supper & room - Rudolph	
Aug. 26 - Breakfast, supper, lodging	
Rudolph Hotel	
Dinner - Hotel Lawrence	.35
Aug. 27 -	
Henry Larchwood Fare - dinner	.50
W. J. Klondike	
J. Alderson - Livery	2.50
Lunch - Gate City Restaurant	.25
Aug. 28 - Breakfast - Gate City Rest.	.25
Quick dinner	.25
Gate City Rest.	.25
Aug. 29 - Breakfast, Dinner - Rudolph Hotel	1.00
Baskets (2) - (R. Hotel 15.00)	.20
RR. to Sioux Falls	.62
Lodging - Dacotah Hotel	1.00
Aug. 30 - Breakfast, dinner, supper	2.00
Dacotah H. Lodging	
Aug. 31 - Breakfast, supper, room - Dacotah H.	1.50
Lunch for field - Boston Cafe	.25
Return - Larchwood - with bags	.30





at (2) on E. & W road  
+ also at little cut  
just N. of RR. W. of H. & S.  
road. there is a yellow layer  
on top, evidently at least  
4-6 ft deep, which is too tough  
for loam - It contains numerous  
small nodules.  
Below it there is gravel (max  
stuff) comes to surface in  
road.  
Over this yellow material  
corresponds to tough dark  
uppermost loam at (1).  
Next hill W. shows red  
loam yellow, nodular at  
top. It is higher.

On the N. side of the  
northwest  $\frac{1}{4}$  sec. 11 is corner  
of sec. 20 on east on  
road from hill west,  
there are two errors. The



Sep. 1 - RR to Shindler .20  
Breakfast & lunch for field Boston 45  
Shindler - Shindler - Cape 10  
Supper & lodging S. Quist .50  
Sep. 2 Breakfast and lunch S. Quist .25  
Lunch (supper) Gate City Rest. - Canteen 1.25  
Sep. 3 Road, Breakfast & dinner, room 2.00  
Train to Klamath 3/4 day 2.00  
Supper - Gate City Rest. 1.25  
Sep. 4 Train to NW. part Lyons 2.50  
Breakfast & supper - Gate City Rest. .50



Aug. 29 - 1910 (Monday)

Packed & sent basket & pers.  
At 2<sup>nd</sup> left for Honey Falls.  
Mr. J. E. Carman left for  
Rock Valley at same time.  
At Honey Falls I visited  
the Ill. Cent. cut again.  
I find a grayish (with iron  
spots) rather soft deposit  
on top in the first cut.

The elevation <sup>of R.R.</sup> down  
near river = 1240.

R.R. in cut 1 = 1260.

Top of gravel bar in cut 1 - <sup>same</sup>  
= 1270

Top of cut = 1285.

The uppermost layer is about  
15 ft. deep in different places.  
It is grayish, soft, with iron  
spots. On the surface it  
appears gray (with <sup>yellow</sup> brownish spots)  
& numerous small nodules &  
a few pebbles are scattered  
over the surface.

97

The gravel & cobble layer is  
strongly oxidized above & sandier  
below. At W. end of cut  
this rests on a joint clay  
with few pebbles which  
has some aspects of Kansan.  
It shows bluish in places, but  
is more or less rusted.

The Nebraska in Hamilton  
1<sup>st</sup> pit is about 10 ft. lower  
than <sup>R.R. at</sup> base of cut 2.

I dug into this "Nebraska"  
over a post & it is tough  
yellow-brownish stuff  
with some pebbles.

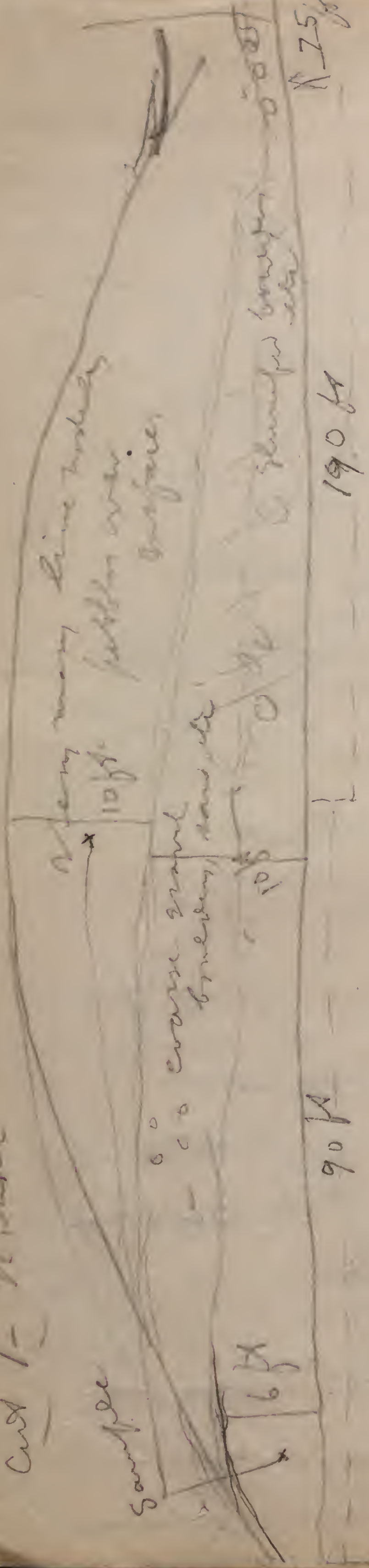
The upper part looks like  
upper layer of Nebraska  
in Harrison pit.

Look sample of Kansan  
from Hamilton's second pit  
this shows some tendency to



Cut 1 - 11 miles

sample

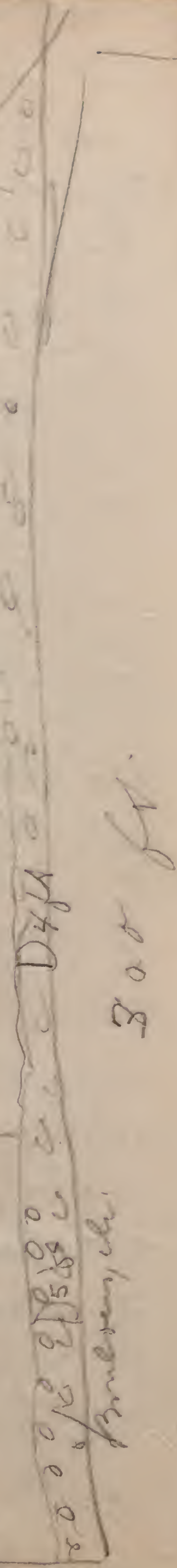


Cut 2 - 16 miles

very many small calc, 8 ft. nodules.

67 ft sand rich.

shells



Cut 2 - 8 miles

very many calcareous nodules. 6-7 ft.

5-6 ft

nodules are thin, very

6 ft.

Cut 1 - 20 miles

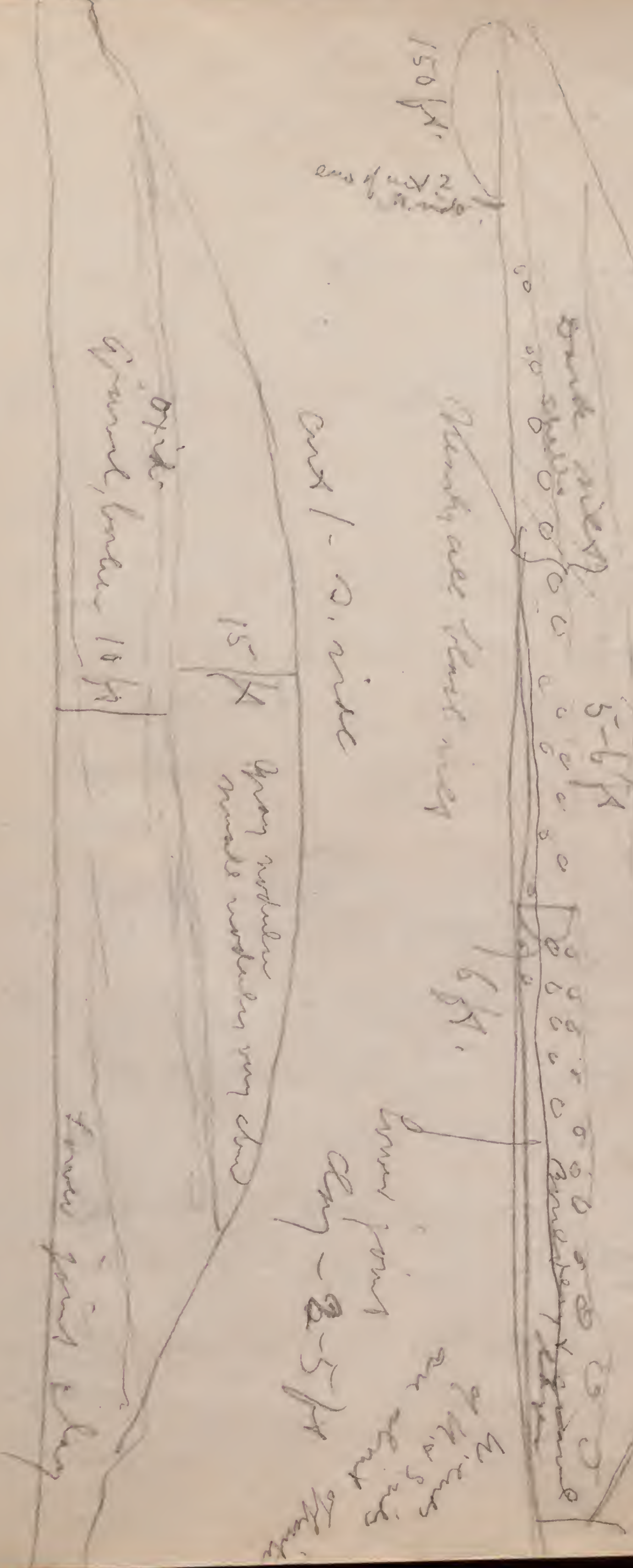
15 ft

very nodular made nodules very dense

low point  
any - 2-5 ft  
of the  
on the  
side  
of the  
point

oxide  
ground, lower 10 ft

lower point clay





horizontal bedding, has bluish  
& red (iron) belts, is a  
distinct joint clay, very  
Kansan like but with few  
pebbles.

It is mixed & slightly folded  
below with the gravelly  
bed.

I should call it Kansan.  
From RR. track at E. is  
of cut 2 to bottom of  
valley NE. is 30 ft  
west RR. U. is E. Northern  
55 ft. lower than I.C. track.  
Almost parallel with it  
is Omaha RR. about same  
height.

W. of Omaha RR. is I. and  
~~less than~~ 1/2 mile from I.C. and  
is a great long bank or  
ridge (isolated) of iron-brown  
sand & gravel - 30 ft. above  
Omaha RR. about 30 ft. lower than

101  
Track at cut 2 on I.C.  
Too dark. Returned to  
hotel.

Aug. 30, 1910 (Mon.)

Rained at night and in  
morning.

Saw Geo. Egan, - fat (220)  
and indolent.

Wrote letters, fixed maps,  
wrote notes, etc.

Went N.E. again P.M.

From (1) crops out only 2 or 3  
ft. below Omaha RR.

which is on lower flat.

Looking E. along E. U. RR.

I could see sugar hills a  
mile or so away which are  
yellow (dry) with scant vegetation.

All else looks fresh.

These hills are exposed to  
SW & W. & are at the head  
of this part of valley.



5 ← 12

Chappell

Big Spring

Box of winter-velvet  
sundries

Dr. N. R. R.

Bracha K.K.

2 - track - 25 ft. higher  
than lowest bottom.

103

cut 4

cut 7

cyf 6

Cont  
29

cont 3

New York  
Columbia

Pish.

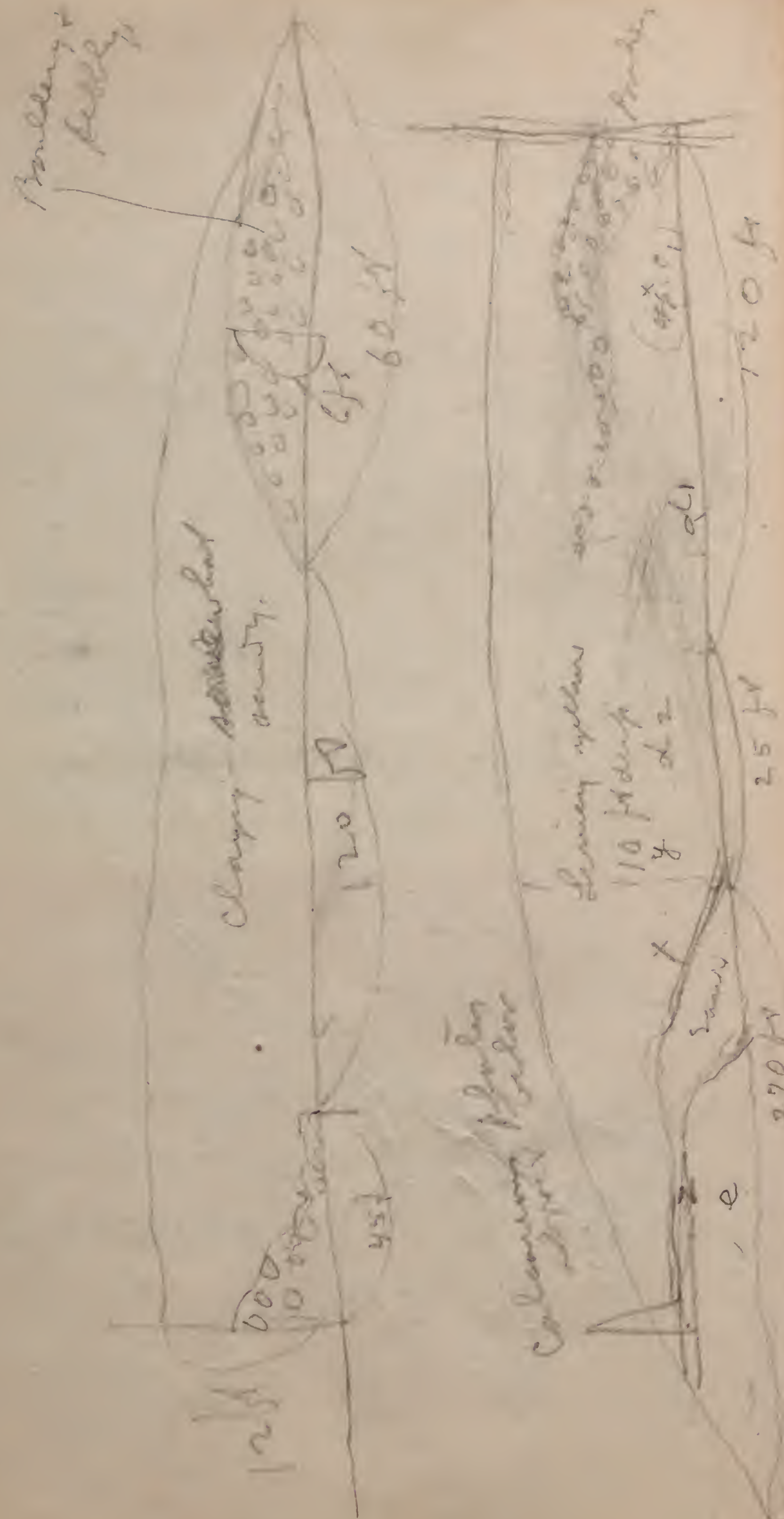
Coclin pld. (2.5th)

27

Handwritten text: *Handwritten*



cut 7 - 1/2 mile



105

The slopes almost to top just S. of cut 7 (on both sides of the ravine) are densely covered with boulders 4-15 in in diam. The great majority are Sioux Q. boulders, many highly polished on exposed surfaces. There seem to be only in the projecting points of opposite sides of the ravine & west of them are S. of the road. They probably represent same horizon as may slight bend part of cut? (east end.) There are also granite, greenstone (dark) & other kinds of boulders, and these look older, but the Sioux Q. boulders mostly predominate. This certainly (?) looks like Wisconsin (?) Some of the boulders are nicely planed & striated. In the cut the boulders appeared only in top. They do not go down.



7

S. mole and 7

Sample

a) is yellowish (brownish) from the upper part with pebbles  
here & there, nothing in layers & fossils (especially in  
lower part) & again scattered. It contains a few  
small corals. See sample of clay & pebbles.

(a) on the wide is similar but harder, & more like joint  
clay. The material seems to be somewhat sandy  
on both sides. The material on the side all day  
is hard & resembles sandstone. It is

There is no loss always in  
this thing.

On the N. side it contains in places numerous small calcareous nodules. The same occurs in places on the S. side.

Westward on the N. side (a) runs  
downward into sand & then a  
darker silt (?) containing small  
boulders & pebbles - Layer (b)  
on the N. side (b) is at least 6 ft. in thickness.

h/ varies in thickness on both sides from a mere streak perhaps not more than 1 lb. to at least 4 or 5 lbs.

It contains old pebbles, ~~that~~  
within granite boulders, and  
also boulders & even large blocks  
(one is  $3\frac{1}{2}$  ft long) of basalt.

Q. The gravel is strongly  
oxidized & somewhat  
cemented. Its contour is  
very irregular.



c) On S. side at (C<sub>1</sub>) <sup>is</sup> a  
bearing together, more or less rusty  
(just below b) layer, - really  
conspicuous with (b) for there are  
pebbles & boulders in it.  
On the N. side just opposite C,  
it must be fully 6 ft. exposure.  
It is blue in places bluish &  
pitted, like Kansan, but most  
of it is rusty & it is mixed with  
sand & there are boulders &  
pebbles in it.

At C<sub>1</sub> (a) grades down into  
fine sand, which again grades  
into b.

(c) seems to grade down (on  
N. side at d<sub>1</sub>) into a joint  
clay, more or less bluish, but  
rusty, with numerous &  
large lime nodules, & pebbles.  
It appears like Kansan.  
(see sample d<sub>1</sub>)

There is a sand layer a few  
inches thick at the base at  
d<sub>1</sub>. (blow my sample)

109  
At d<sub>2</sub> the uppermost sandy  
& bouldery layer is only about  
3 ft deep & then about  
10 ft. of what appears to be  
a Kansan joint clay, with  
pebbles, calcareous nodules, etc.  
It is bluish, but partly stained  
rusty. Very tough.

On S. side this is similar  
but softer.

On both sides it seems down  
to a silty layer (x) & below  
that is fine sand.

d<sub>1</sub> is very rusty just above  
(x). F

Below the sand below (y) on N.  
side there is a tough bluish  
clay, & lower down still  
there is a nodular layer  
between it and the sand.

At deepest place sand is  
about 6 ft & tapers down  
under road up hill, &  
upward into bank downhill.

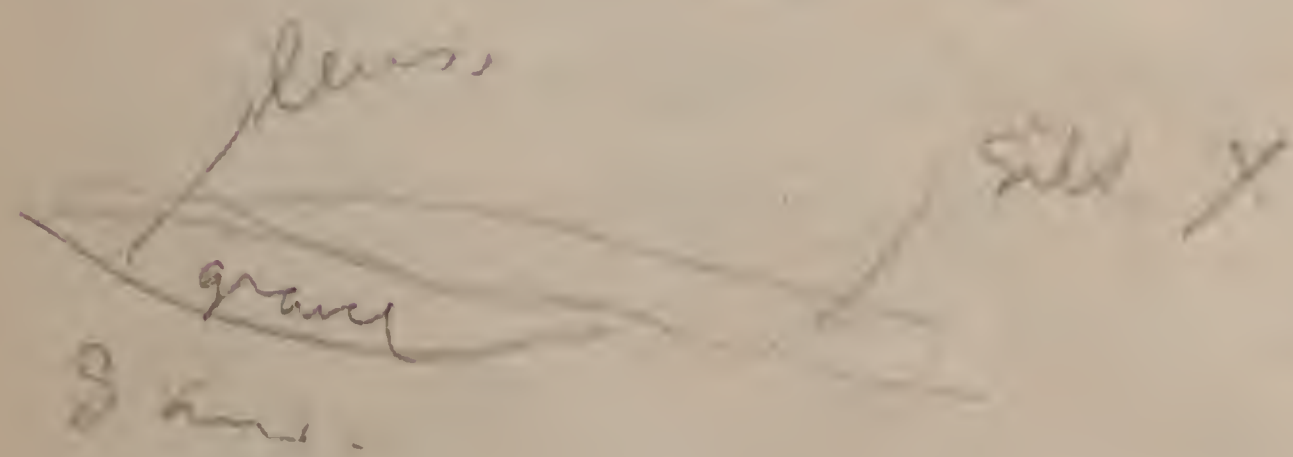


above (X) S. side there is  
a very rusty layer in which  
red sand pockets are common.  
The lower sand is whitish.  
A little farther down  
this <sup>out</sup> runs <sup>out</sup> laterally, & a  
bed of gravel appears  
above the sand.

The silt below sand is not  
unlike silt band (X).

The silt band again reappears  
at Z & the gravel is above it.

On N. side the silt  
band (here 3 in thick in places)  
also runs out & gravel appears  
in part below, partly above.



(c) is exposed westward on  
N. side at least 6 ft

(S. side)  
At 2, silt appears above &  
below a belt of gravel (6 in)

At 2 N. side a bed of  
coarse sand, 6-8 in, runs  
below fine sand.

The lowest layer (c) is  
very tough, yellow or rusty  
(like my Nebraska in  
Hamilton pit!). It shows  
bluish streaks.

There are strong calcareous  
plates (horizontal) in (c)  
at different levels.

This lowest layer has  
bluish silty layers in it &  
also rusty ones. It contains  
a few scattered pebbles &  
is very tough.

Portions of it appear like  
Kansan (bluish)

The sand runs to a foot or  
two westward & above it  
is a very calcareous fine  
clay with few pebbles.  
This also looks Kansan.  
There are rotten gravel



boulders in lower till on  
S. side where it is thicker.  
I can see very little difference  
between the two layers  
above & below sand.

Cont 6. ~~Smaller~~

Bully mixed  
folded.

RR

sand & gravel  
with debris, large.

270 ft

The sand is largely very rusty

sand  
boulders  
20 ft

50 ft

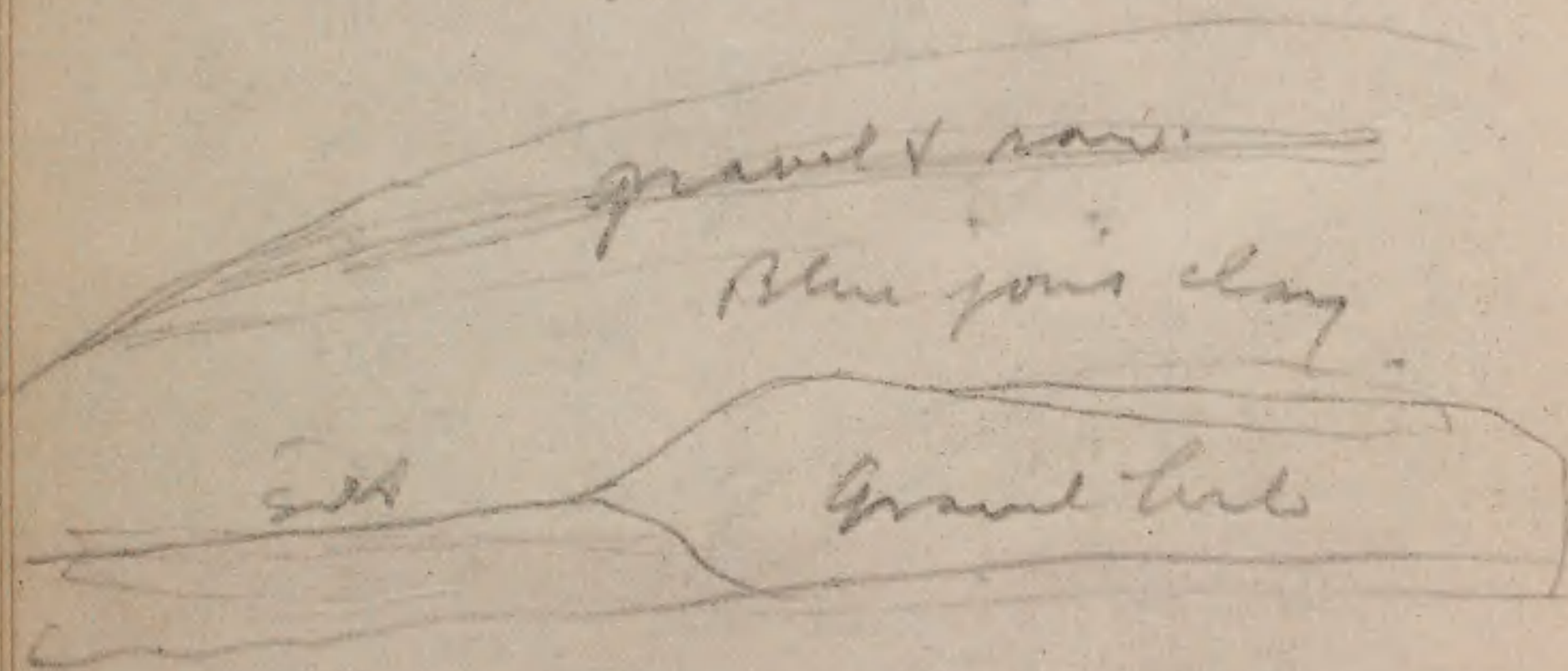
of the lower tough layer 3-5 ft. or more. It contains  
a few small boulders, pebbles & in places a  
little calcareous. The sand & gravel layer is  
very irregular & mixed. The gravel contains lots of  
rotten granite boulders.  
Gravel thin and scattered & fine sand appears  
above. The uppermost layer is like (a) in 7.



The gravel (some sand) boulder  
is 20 ft long & 5 ft. across  
in height.

It has the same joint clay  
in it that appears in  
Hamilton's pit. Silt surrounds  
the boulder, a line running E.

The gravel layer is above  
this blue joint clay.



Gaps & gravel, N. side cut 6  
suspension, boulders.

like clay in (7.)

a sandy joint clay, 2-4 ft.

fine sand 4-5 ft.

Lower tough till (?)

The layers of sand & gravel are irregularly interbedded,  
but the lower part of lower layer, which is very  
coarse, is a blue layer of "gravel" - now known  
say it is water worn in dry weather.  
The sand & gravel thin out & disintegrate.  
This is badly mixed. Lower tough till  
contains little granite boulders.



The lowest layer (in road)  
is very tough, redder above  
becoming blue below. Is  
at Nebraska! (?)

C. J. Collins own pit  
west of RR.  
About 15 ft in course  
can be found a horse  
tooth. There was also  
a piece of elephant tooth  
found about 20-25 ft.  
deep. -

The horse tooth - a tusk.  
There is also a small tooth  
like a horse' tooth & a  
big canine. -

August 31 - Wednesday <sup>117</sup>  
Went out toward peritostary to  
see cut of South Dakota Central  
& Milwaukee roads.  
The cut is badly slumped, but on  
W. side shows drift to top. It  
is the yellow (brownish) rather loose,  
in places jointed clay with few  
pebbles, iron stains, & a little  
lime.

It is plain that the hills along  
river on S. side (very dry hills &  
beyond) are higher than the  
plain on which the few stands.  
The higher ridges are the  
moraine, no reports.

The RR has ascended from flat  
15 ft. to this cut.

The material, <sup>in cut</sup> is soft near surface  
but underneath it is harder, more  
jointed, with chink surfaces, -  
resembling Kansan.

On W side near top a few feet  
clearly exposed show some  
tendency to develop stratification,  
& alternation of bluish & rusty  
layers shown above seen in  
Hamilton camp pit. This is very hard.  
A few boulders appear just above it.

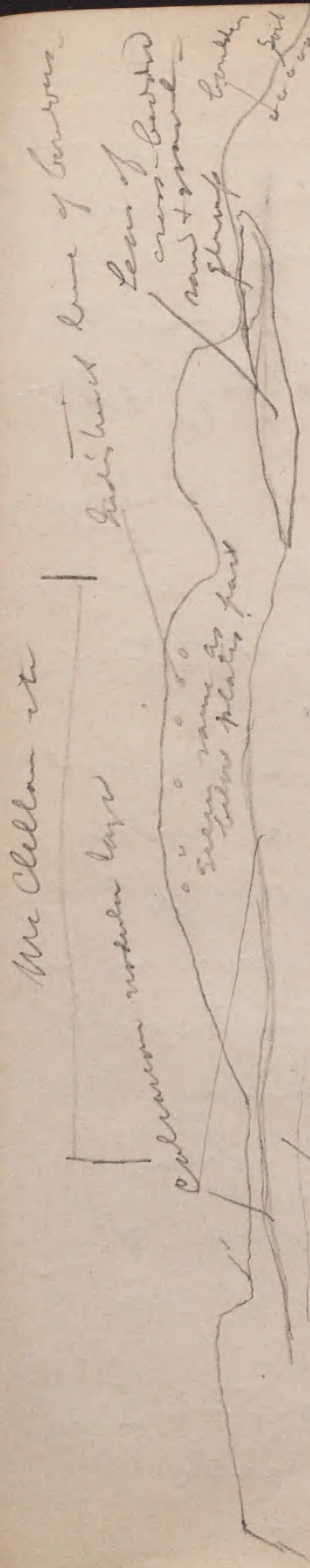
This cut is over 20 ft. deep.



along street can line about a  
block S. of pen, terminus, on  
W. side, a cut 6-8 ft. deep  
shows:

Line of boulders.  
Black soil 1-1 1/2 ft.  
gray sandy layer 1-1 1/2 ft.  
yellow compact hard gravel  
6 ft. blue, dark, calcareous, few pebbles  
drift

One block & a half farther  
S. - on Main Ave. N. opposite  
east end of McClellan st.  
there is a high cut (fresh)  
about 20 ft high.



McClellan st. - yellow brown drift, blue  
stains (like Hammon). few pebbles.  
The lower drift (a part below calc. layer) is very  
tough, joint stuff - with brown & blue streak &  
clodding & pattern pebbles & mussel boulders.  
The two layers of till are same. Upper shows  
a big block of angular stone.  
Above the calcareous plate - lower there is a thin layer of  
sand, 3-6 in. (oxidized)



South of Middleton str.  
a lens of coarse sand & gravel  
with a few boulders, shown.  
It is about 40 ft. long & 4 ft  
deep in deepest part.  
It is up about 12 ft. from  
rock.

This is a block N. of Brewery

Went over to Ill. Cent. again.  
The base of Collins pit is  
20 ft. below RR.

The sand & gravel is exposed  
about 15-17 ft., & has about  
6 ft. of blue joint clay, iron-  
stained, very hard, same as in  
near Hamilton pit, - above it  
the upper 6 ft. is gravelly, then  
3-5 ft. of sand with, then  
beautifully cross-bedded sand &  
fine gravel (C. says it gets  
coarser below).

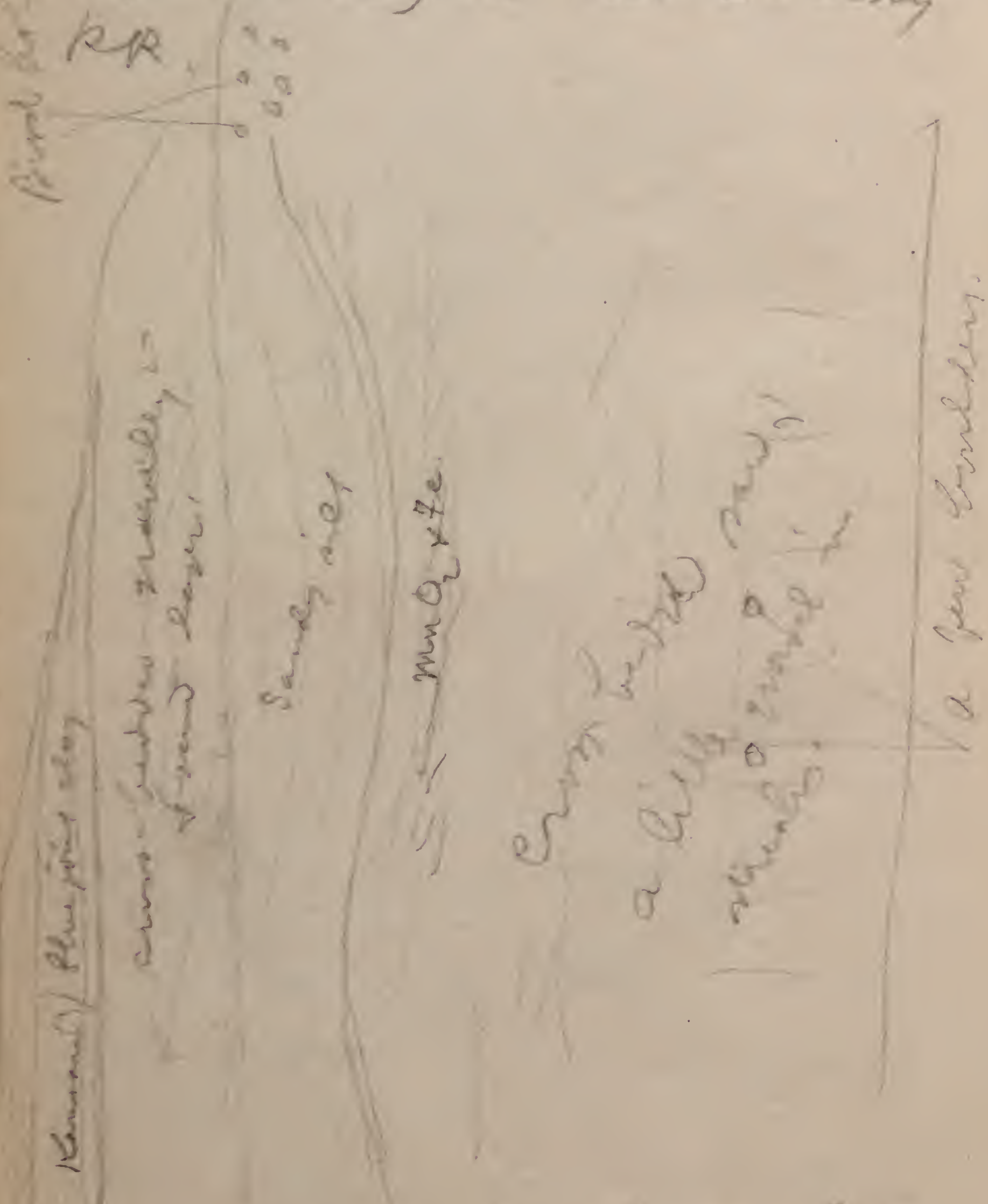
The lower part is streaked  
abundantly in places with  
 $MnO_2$  & iron occurs in

bands, streaks & clonings<sup>121</sup>  
in various parts of the section.  
It is here, at a depth of about  
20 ft. that a horse-tooth, a  
small tooth like that of  
horse, & a large canine were  
found.

This certainly looks Aftonian



The top of the gravel in this pit is about 2 or 3 ft. higher than top of sand in new Hamlet pit, and it is on a level with the top of the silt layer (dark) in cut 2 - along RR.



From this fragment, a *Aphacrin* valve in lower cross-bedded sand.

The shells were at a depth of about 12 ft. from top of gravel.

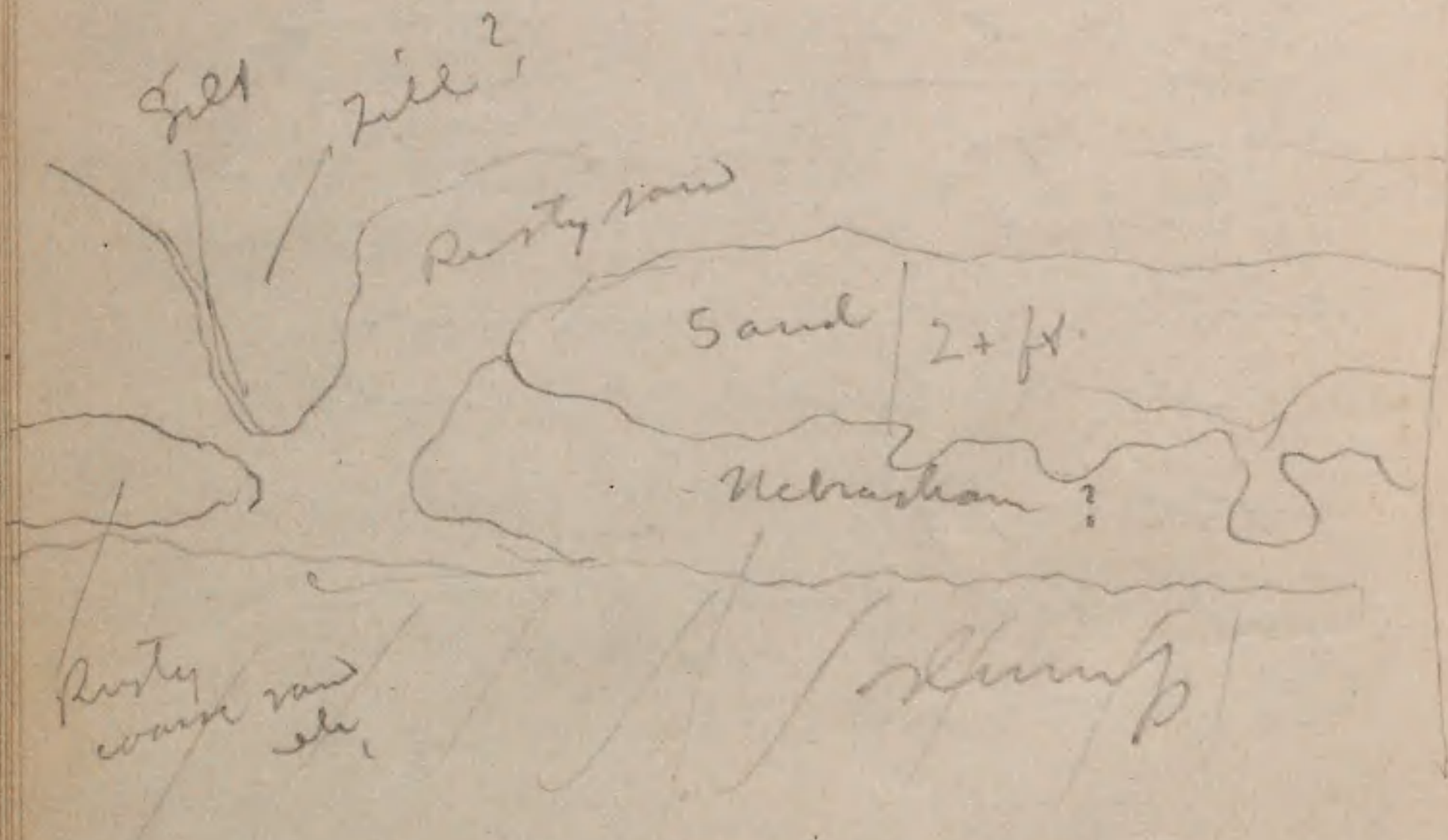
In cut 3 - the section shows they struck streaks of gravel at base. The cut must have come down just to level of gravel in Collins pit. The latter is just W. of right of way - runs to fence.

4-6 ft sandy - some nodules  
a gravel bed 1 or 2 ft.  
6 ft. Gray - same as above  
silt - cut 1-2

The gravel spreads all over lower part from this layer. The lowest layer becomes tougher below. The uppermost layer is yellowish & almost loose like at base. The lowest layer seems to be quite free from pebbles.



cut 6<sup>7</sup> N. ridge.  
 Photos 27 & 28 -  $\frac{1}{2}$  -  
 " 5 & 6 -  $\frac{1}{2}$  +  
 (this was W. end)

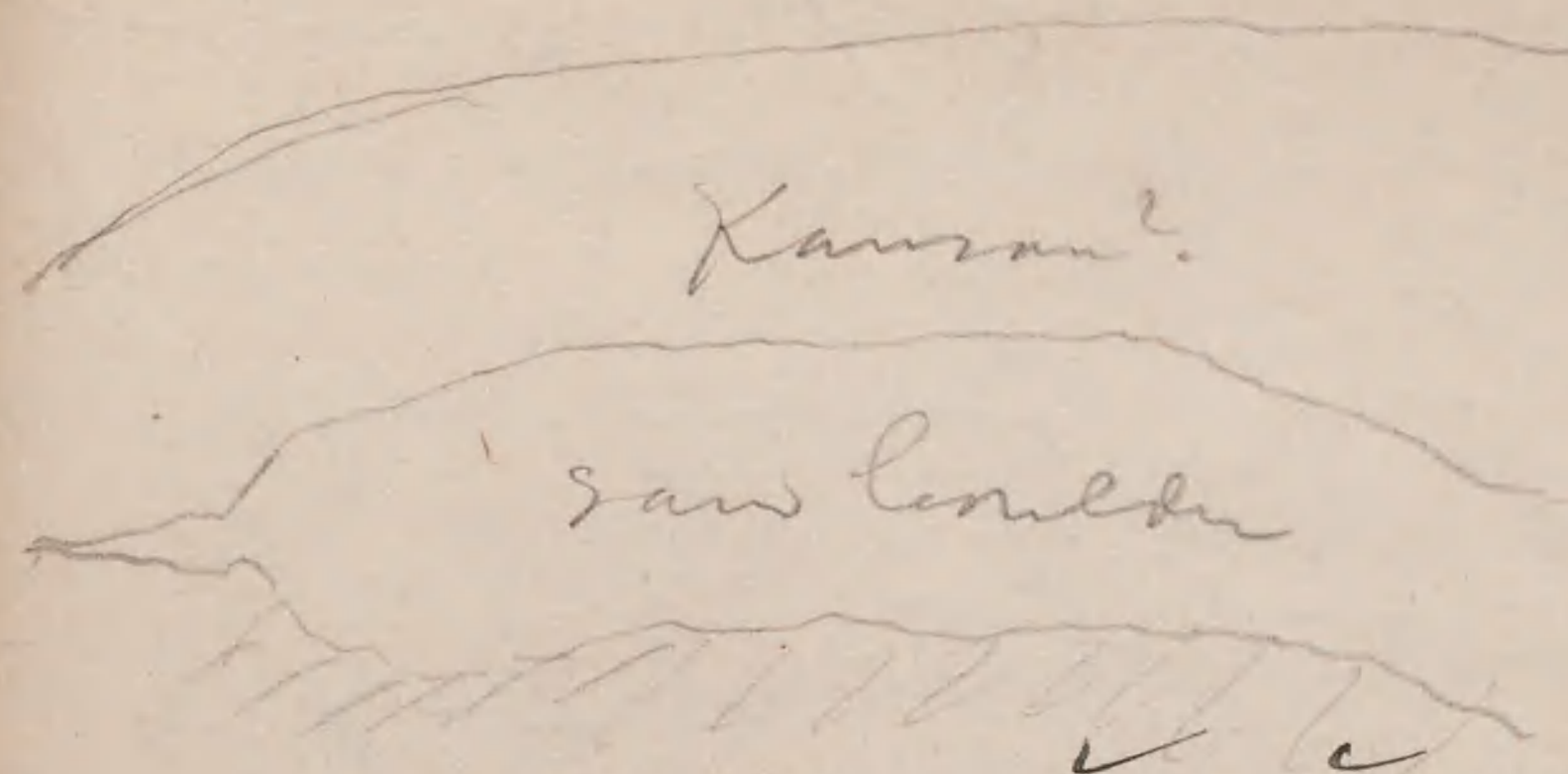


This is probably a  
 boulder of Nebraskan.

Work outside of Nebraskan?

It is tough, light blue with  
 very dark ferruginous streaks,  
 & has a few pebbles & occasional  
 boulders.

125  
 S. side big boulder



Photos 23 & 24  
 Photos 13 & 14 looking N.  
 at bouldery slopes S. of

cut 7.  
 Mr. Casman joined me. He  
 thinks these boulders show just  
 edge of gravel terrace.  
 (see p. 103)

Cut 8 shows about 6-8 ft  
 of sand & gravel, with  
 blue joint. clay above.  
 A spring comes out at foot  
 of bank.

The sand & gravel (very ferruginous)  
 runs farther up the slope &  
 contains a few large boulders.  
 On S.W. side of RR gravel & boulders  
 also appear.



In NW 1/4 of sec. 14,  
Cut 9 in SW. of the Rd.  
probably 600-700 ft from it  
It shows sand & gravel near  
the top.

Sand also is exposed irregularly  
to a depth of 20 ft.

At 8 ft. & below (2-4 ft  
thick) is a layer of coarse  
sand & fine gravel with a  
large number of streaks &  
lines of MnO<sub>2</sub>.

<sup>cut 10</sup>  
In NW 1/4 sec. 22 (not far from  
center) is a gravel pit with  
fully 20 ft. of sand, gravel  
& well exposed.

The upper 3-6 ft. is the same  
mixed stuff as common at top.

Then 5-7 ft. of a yellow fine sand.

Then about 2 ft. of coarse sand &  
fine gravel with much MnO<sub>2</sub>.

Then 2 or 3 ft. of coarser gravel.

Then 6-7 ft. of fine cross-bedded  
sand, Below coarse gravel, ferruginous

127  
In the lower part this is more  
clean & light brown. In the  
upper part it often shows  
wedges.

On the E. side, there is a  
lot of loam-like stuff at top.

The uppermost layer certainly  
looks like loam. (See sample)

It becomes sandy lower down.  
(On lower levels & in lower part.)

Another large pit is located  
a short distance south. It  
is said not to be worked & I  
did not visit it.



Albert Collins owns pits  
The first pit (U) is best &  
there is at least 20 ft. of  
clean sand & gravel.

The two teeth came out  
of the sand - exact depth  
not now known. -

✓✓  
At cut 6 - took photos 3 & 4

S. side - same boulder

Other boulder appears even  
in hard muddy stuff at  
base of slide.

This suggests that all this  
is Kansan also.

In this back narrow down  
the RR in some place a  
belt of sand & gravel lies  
above Kansan & below  
the upper sandy layer.  
A gully cuts off cut 6  
from the RR cut. The latter  
shows gravel around house  
on S. side.

129  
Cuts (6) & (7) are only sec  
line.

Collins S. pit (new one)

shows joint clay & silty

stuff above, fine sand &

then coarser lower formation.

They get nothing from this  
pit in the way of fossils.

About 10 ft. of sand exposed.

The upper joint clay in

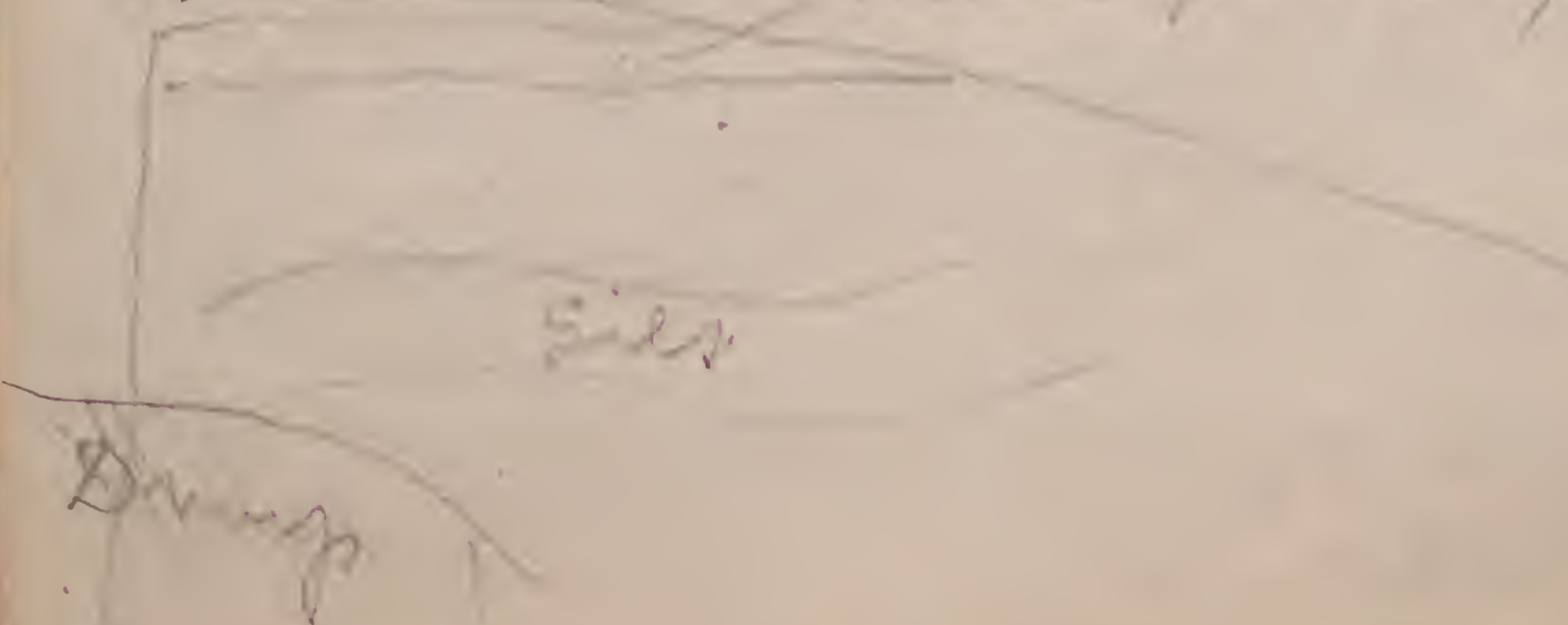
this pit is dark brown

The 3<sup>rd</sup> or 4<sup>th</sup> Collins pit  
shows only fine sand. Not  
washed now.

Collins S. pit (one yielding teeth)

Photos 2 & 3

thick joint clay





Returned to cuts (1) & (2)  
along RR.  
(The 3<sup>rd</sup> cut also shows  
gravel but above Kansan  
& below sandy loamy stuff.  
(The Kansan above sand  
in Hamblet pit, in cut  
6, some shaly looks  
stratified & not normal  
Kansan. That in cut 17)  
looks better, but still has  
a peculiar aspect.

Cut 2 N.E. to

sandy alluvial  
sand & gravel & silt  
silt (dark) very fine  
pebbles. Soft outside.  
Boulders, pebbles, sand.  
silt?  
Is it possible that all on  
E. side below top layer is  
Aftonian?

(5) W. side

131

1. 4-5 ft yellow clay
- many 5-6 ft. same gray stuff as  
nodes in cut 3. very calcareous, these
- 2 above Kansan (or Aftonian?)  
Boulders (a few)
- 3 Gravelly sandy layer some  
boulders - about 2 ft.
- 4 4-6 ft of dark silty  
with few pebbles

5 5-6 ft of dark silty  
mouldy layer at base

The boulders at  
near base (of which I  
mentioned before) seem to  
have come down from (3).  
On W. side the boulders  
below do not show southward



2 Samples - cut 2 - 10. side.

1 - sandy

2 - gray, calcareous

3 -

4 - dark silt.

(m)

\* 8 in., about 10. side

7 Sandy, silty, with streaks (?)  
4-6 ft

2 Gray, calcareous  
4-6 ft

3 Sand, 10. side, with streaks.

4 Dark silt  
about 6 ft.

5 0.5 ft of sand, gravel, & gravel  
overlain

6 Yellow till?

This is sandy, silty, with  
pebbles, & shows jointy  
character.

Toward  
the end the gravel & boulder  
layer below runs upward  
& is continuous with the  
big bed of gravel & boulders in cut (1)

133  
My horn teeth were from just  
above or on the gravel, but  
may have been in the silt  
which here thins out, &  
doesn't show in cut 1

Cut 1 - 1/2 way west - (at side)

1 (Sandy) here red to brown like  
or redder, heavy (silty) 2-5 ft

2 (Calc. gray) - here tougher &  
thinner 7-8 ft. Calcareous  
nodules & scales are common.  
Gray - pebbles scattered.  
This is jointy & more like

3- weathered brown - 1-2 ft  
3- sand, gravel, boulders, mixed - 1-2 ft

4 - bottom of dark silt  
is a layer of red silty, more  
a less sandy & pebbly stuff.  
2-4 ft

5 - sand, gravel, boulders  
5-6 ft

6 - Yellow till - 2 ft +



I dug well into the  
lowest layer at W. end (S. side)  
of cut (1) Ill. Cent RR.

It crumbles like Nebraska,  
but is not so hard, & is  
stained with iron. Where  
bluish it is rather  
light.

However, I think it  
a phase of Nebraska.  
There are scattered pebbles  
in it.

NE side of cut 1 is similar  
to sec. of opposite side, but  
upper member not so  
prominent.

I believe gray layer to  
be Kansan. It lies above  
Kansan in cut (3) (Kansan  
in Collins pit), it is  
on level with Kansan

in Hamilton pit, & in  
SW side of cut 1 it is  
a joint clay, in places  
quite hard.

The lowest member on  
NE side of cut 1  
crumbles, is hard, & in  
places dark, but  
mostly rusty.

Met Mr. Eberhardt, in  
Bernhardt's drug store.  
One of my boys.

The materials, even in Afton  
beds, along river were  
too coarse in these upper  
courses of the stream to  
furnish loess material.



Sept. 5, 1910

Left for Shindler at

10<sup>10</sup> AM. A fine day

After leaving the river, the topography between Sioux Falls & Shindler is level, with frequent low spots, sloughs, etc.

Beyond Shindler the topography breaks a little. There is a dip downward toward the river & there are numerous drainage draws along which erosion is working back.

Cut 1 The first little cut E. from Shindler shows what I would call weathered grayish Kansan, with some brown stains and numerous nodules. Pebbles & a few small boulders are scattered over surface.

This material is soft at surface, & looks like material called Kansan in upper part of S.W. side of cut 1. (Ill. Cut) at Sioux Falls. (There is a smaller low cut 2 pole lengths north Shindler). Cut 2 ft. deep. This  $3\frac{1}{4}$  wide road is at S.W. end of this cut.

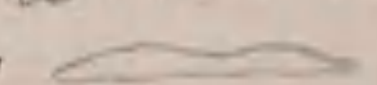
Cut 2 Another cut, on W. side, right next to it is deeper (by gutter) 8-10 ft., & shows typical jointed Kansan below. The upper part is often weathered gray Kansan (as in 1<sup>st</sup> cut). It is tougher &

137 somewhat jointed at greater depth. Cut 3 on E. side just beyond creek shows Kansan Cut 4 on N. side just before 2<sup>nd</sup> crossing of creek, is exposed (by cut & gutter) at least 18 ft. It shows Kansan from top to bottom. Softer above, jointed & crumbly below. Pebbles & a few small boulders are scattered over the weathered yellowish surface. It is quite calcareous.

Cut 5 is made across a narrow ridge just E. of 2<sup>nd</sup> creek crossing. It is about 12 ft. deep & shows small pebbles & a few larger boulders on surface.

The lower part is hard, very jointed, much of it brownish. Above it is hard & brown, a joint clay not unlike that at top of Collins N. pit at Sioux Falls.

Cut 6 is along N.V.S. road just E. of cut 5. It is about 8 ft. deep & shows Kansan from top to bottom - the gummy, crumbly, brownish streaks, bluish weathered hind.

Cut 7 is a double cut  6-8 ft. shows Kansan. In a pocket at E. end of 10, section of it.

There is a pocket of ferruginous gravel.

Cut 8 - On S. side RR. About 15 ft. Kansan - A few large boulders.

Cut 9 - Is similar & about same size.

Cut 10, just beyond (9) & almost continuous with it, is 20 or 22 ft. deep (about like



all these cuts which cross narrow  
lobes projecting into the creek valley  
gravel on surface; also a few boulders.  
Digging showed good typical hard  
jointed Kansan from top to bottom.  
Bottom covered by lumpy bluish  
weathered stuff.

What I take to be U.S.  $\frac{1}{2}$  sec. line  
cuts W. end of this cut.

(There are occasional springs along  
here which come from below (or  
in??) Kansan. Probably Aftonian?)  
Cut 11 (about 18 ft) is on top of hill  
along wash road, S. of RR.

It shows typical jointed, hard  
dark-stained Kansan with  
pebbles, caliche, & a few boulders.  
There is a streak of silty (mud?)  
in upper part. Runs out laterally.  
The chief part is E. side. W. side  
is low.

Cut 12 is about 8 ft. on N. side, &  
4 ft. on S. side, - just end of ridge.  
Shows Kansan.

Cut 13 is about 20 (or more) feet deep  
on S. side (N. side is low) & shows  
typical Kansan like preceding  
exposures. This is last one before flat  
is reached.

The topography from cut 1 to the <sup>139</sup>  
river valley is rough rolling  
Kansan, - the plain at Shindler  
gradually dropping into it, showing  
that roughness is result of erosion.  
Scattered boulders are found on all  
the slopes of the projecting spurs  
or ridges which jut into the valley  
of Spring creek.

Exp. 14 Up the river from the bridge,  
at first bend, there is a hard  
bench reaching about 2 ft. above  
the water. It is blue (rather  
light) very tough, & impervious  
to water, which seeps out  
all along the bank for 200 ft.  
from the thin (8-12 in)  
sandy layer immediately  
above it. The lower  
member is evidently Nebraskan,  
& the sand a thin edge of  
Aftonian. Above this is  
a mass of Kansan, - very  
hard, dark & jointed below.  
The sand is oxidized in its upper  
2-5 inches & blue below like  
Nebraskan.  
See sample of Nebraskan?



Exp. 15 is where 2<sup>nd</sup> bend comes to bluff. It shows Kansan above but is badly slumped.

Exp. 16 The 4<sup>th</sup> bend where river strikes bluffs shows a big slump. The lowest part is very dark & may be Ostracodan. There is a little sand running down on slope.

The whole slope is badly slumped. crossed to Iowa side.

Inquired for well-records at five places & found two others tenantless. Evidently wells are shallow & soon strike gravel.

S. of Mason house in S. part of sec 13 - 100 - 49. a

number of springs come out in a gully, from bench.

Evidently gravel & sand underneath.

This covers the entire bench or terrace N. of the R.R. for the main No. of gravel pit is on lowest bottom.

This bench or terrace looks very flat from a distance, but

141  
as a matter of fact it very much broken up, with drainage channels and groves, some shallow, some deeper, scarring the entire surface. Revised location of gravel pit (see plat).

Visited pit again

J. M. Fritz, contractor, found a bone in gravel at least 9 ft. from top of bank (in 5-6 ft. of gravel). It is the broken bone, like scapula.

The gravel bed runs thinner to south.

Top sandy & somewhat pebbly - 6-7 ft.

Gravel 4 ft.

Yellowish till (?) 5 ft.



The lower member breaks up  
in joint-clay fashion, but  
also scales horizontally as  
if silty. There are pebbles  
scattered through it.

It is bluish, but iron-stained.  
It certainly is not Kansan.

The gravel is very strongly  
oxidized just above this layer,  
& more or less throughout.

When I dug up a lot of it  
it crumbled into small blocks,  
"starch lumps" - fine - not  
like Kansan.

The silty structure is only  
apparent - due to horizontal  
breaking of stuff.

It weathers grayish.

The uppermost layer is brownish  
yellowish, somewhat loamy, but  
tougher, & with sand grains &  
occasional pebbles.

It looks like uppermost layer  
SW. side cut 1 (H.C. cut) Sioux Falls,  
(see sample).

The highest (H.C.) end of 143  
Indian plateau is 50 ft  
above lowest river bottom.  
Gravel rises to at least 35  
ft. in N. end, & big boulders  
appear above it.

Large boulders are scattered  
about (many dropped out) on  
this end, - a slope, & they  
evidently came from the gravel.

They appear like Kansan  
boulders over the surface, - old.

At NW end about 40 ft.  
above bottom.

Went across river & south  
cut along river going up  
hill (private road) shows  
Kansan.

The same slump, just above  
bridge, shows same with  
spring at very base.  
Evidently like place above.

RR bridge



The top of Kansan plain  
just N. of RR bridge is  
70 ft. <sup>80</sup> above lowest level of valley.  
The ~~ground~~ <sup>hill</sup> NW from my  
2<sup>nd</sup> stump N. of RR bridge  
is  
which is 165 ft. above valley, & the hill  
rises about 10 or 15 ft. higher.

It is on a level with  
the hills SW. of Granite.  
From the lower Kansan  
plain level the  
plain SW looks level,  
but I know it to be cut  
up by sharp narrow  
ravines. (The highest point of  
ridge is just about where  
school in sec. 14 stands.)

Kansan boulders, - coarse  
granite blackish green, & a  
few 300 Q. They look  
exactly like those on other  
side. The extent to within  
25 ft. of top of hill & top shows  
pebbles in soil at surface.  
The big mound has been opened.

As views from the big Indian  
mound the plain to SW  
slopes to SE & looks like  
Canton plain.

The terrace E. of river is  
but little below general  
slope of Kansan plain.

The Kansan ridge extends  
to NW, how far of course  
I could not see, but it  
probably connects with the  
high hills E. of Long Falls.

Returned & went to hill SW.  
of Granite where I left my  
terrace Monday. Found it.

Put up at Quist's for  
the night, and had the  
first long night sleep since  
in the field. Slept from  
9 PM to 6 AM.

Cloudy - thunders some most  
of the day. S. Quist



The gap between end of little  
granite terrace & the N. side of  
great terrace (at bridge) is  
about 50 rods. The terrace ridge  
is over  $\frac{1}{4}$  mi. long. It looks as  
if creek may have cut off crest  
to hill, where RR is, at one time.  
At bridge the granite is exposed only  
near top - dirty gravel. & below  
is clear bluish, calcareous, mottled  
Kansan. Is it not possible that  
Kansan block the valley, forming





a lake, & that there was overflow  
over the small terrace, but  
that larger terrace represents  
Aftonian swamps, etc, filled up?  
Or the small terrace was a part  
of large one, and water cut both  
sides.

Note reentrant valley S. of RR cut.

Looking across river - the mass  
N. of RR bridge, & about as far  
west as I could see, is distinctly  
above the level of the great  
terrace, while the latter is  
only a very little below the general  
Kansan plain S. of RR bridge.

The hills N. & N.E. of granite are  
of the lower type, excepting  $1\frac{1}{2}$  miles  
N., where ridge is higher.

From the granite terrace, looking S. & W.  
there is a noticeable depression in  
the great terrace close to the hills  
and where cut 2 is located. This  
depression is noticeable beyond the  
creek. <sup>cut 2</sup> <sub>hills</sub> terrace

Took two views of Kansan 149  
topography with burial mounds  
1 & 2 from E. slope  
13 & 14 " W. slope  
North looking S.E. { 1 & 2 nearly  
S.

Visited cut 2 again.  
The material in all of east  
part is yellowish, mostly soft  
(though I found where we had  
been digging that it is jointed  
& quite hard on exposure) quite  
calcareous, & with a few pebbles.  
If it is Kansan (it has the  
aspect of weathered Kansan) it  
is very much weathered & may have  
been redeposited. Found no  
lamination, however, it is  
the granular, soft, lumpy stuff,  
though softer than that  
seen in Kansan on W. side.  
The east part of cut is over 12 ft. deep.  
This stuff extends for a little over  
4 pole lengths. Then for about  
1 pole length it is more gravelly,  
though otherwise similar.  
Then comes the big blocks, boulders,  
etc., to W. end, ~~it seems~~



The eastern part, where becoming gravelly, seems to be more foreign in strata & clodding. It is jointed quite distinctly in this part.

For a little way only a few boulders appear. These very many & very large, but all seem to be derived from the upper 6 or 7 ft., where there are rotten boulders, mixed gravel, lime rock (splintery)

The bottom bed is not a regular  
gravel bed, but there are  
rotten boulders, composed of a  
gray very tough granite (finely) inclined.

The lower layer breaks up  
into small blocks, is quite hard,  
& at least 9 ft thick (see sample)  
This looks as if boulders had  
been simply dropped in a  
restrictive area. Contain  
brown layer with brown layer in  
(pit.)

Went south along road from  
cut 2. The first hill  
seems to show *Platanus*.

many now it has a pretty

W. and 2  
O O 1-2-1 O  
g-9 Jd printer, Longh.

detached (by  
depression) knote  
which is covered  
with large boulders  
(Kansan). The  
W. end of crest  
ridge (W. exposure)  
is similarly covered  
with large boulders  
& these parts  
are probably  
Piedmont's horizon.  
The west end of  
2<sup>nd</sup> ridge is also  
partly detached  
leaving ridge  
on N. side, than  
yellow, granitic,  
grassy, pebbly,  
caliche Kansan  
above it ( $\frac{1}{2}$  way down  
slope) is a laminar  
gray sandy layer  
(sandy ridge) &  
above it again  
Kansan. It  
evidently belongs  
to Kansan





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The highest point above cut 3 is about same altitude as top of highest ridge on W. side visited yesterday. It is about 150 ft. above the RR.

A westerly view of Kansan plain W. of river is here obtained. It continues far SW + W, - S. evidently to Canton.

This plain slopes up gradually on a regular & gentle curve to the highest ridge (moraine!) <sup>today.</sup>

The chunk NW, on west side is west of ridge.

Cut 3 shows yellow (almost grey) stuff at top & below it 4-5 ft of a somewhat shaly gray, very calcareous, in some places somewhat sandy material.

On E. side, there are boulders (drift) above it.

It evidently belongs in Kansan. It is about 95 ft. above RR.

Gravelly till shows on lower slope south.



cut 5 shows a white, very  
carcaceous (many nodules)  
material with few pebbles.  
Above it is a mass with  
large boulders, evidently drift.

This gray material evidently  
belongs to Kansan. (see sample.)

The cut 6 is the yellow sandy  
loam, not examined Sunday.

Half a mile S. of Oshkosh,  
on W. side of road, large boulders  
appear on edge & slope of a  
ravine cut in <sup>2nd</sup> terrace.

Many appear along a little gutter  
(or run) that crosses the road.

Went to springs at home &  
got a drink. ✓✓

Took photos 3, 4 looking  
N. toward the old bridge.

Made top of bluff in up-  
hill exposure (near N. end of  
road) 115 ft. above bottom

going down the river I found  
one very sandy place and a  
little streamlet in another  
place. Otherwise everything  
appeared Kansan.

About  $\frac{1}{2}$  mile down (or less) where  
river comes close to bluffs a  
2<sup>nd</sup> time there is a whitish  
jointed inferior layer, like  
below <sup>RR</sup> bridge. This is evidently  
a phase of Aftonian.

Only 2 or 3 ft. above bottom, &  
about 8 above water.

A spring comes out above this.  
Above there is a layer of  
fine sand, laminated & cross-  
bedded (somewhat as far as I  
could see) about 10 ft.  
exposed.

Farther up gully Kansan  
shows.



The ridges just above  
Michigan bridge road, & S.  
to end of range, are bare &  
show with gullies, like  
knobs W. of road & S. of RR.  
Hence Wisconsin?

At the end of the ridge (which  
runs down by a gradual slope),  
there are two more, alluvial  
with a thin to be made of  
yellow loam (but sandy)  
top, probably carried up.  
This point is 115 ft. above  
bottom.

There are boulder strewn slopes  
everywhere S. of road.

The ridge is entirely  
calcareous, Gervaisian  
Kansan down to top, but  
5 or 6 ft. below in gully  
at base a little belt  
of Gervaisian sand.  
This may be alluvium pushed

up.  
The highest part of this ridge  
(northward) is about 150 ft. above bottom.

The little cut on top of first ridge W. of bridge shows  
very oblique bands of  
reddish sand. May be  
Aftonian? Or Kansan?

To top of sand - 50

" " " " " " " " " " " "  
(dash 40. also taken  
above sand is Kansan to top,  
then about to 125 ft.

Photo 29 x 30.  
John Hanson note from bridge  
(looking E.) Photo 29 x 30  
Don't lean out.

Photo 30 x 30 - same - both lenses.



The terrace on S. side of  
bridge is 50 ft. above bottom.  
The intersection of road nearly  
1 mi. north is 70 ft. top of  
glaciation and is 100.



All this country around intersection is cut up by ravines, but it is all a part of the same plain. At the intersection several cuts appear & all show Kansan, - some very ferruginous, some gray & brown & lumpy, all calcareous, & with pebbles & small boulders.

At upper end of Peterson's crescent up a little valley cross-bedded sand shows up to a height of about 30 ft. above the bottom. It is about 7 ft deep & water (strong) runs out at base.

Distinct Kansan lies above it a few rods & another nearby sandy place is back in short ravine.

The next ravine S.E. shows another all the sand and nice streamings of water. There are all N.W. of fence, & close together.

These a few rods farther in a similar spring appears. This is S.E. of fence. Then where river cuts bluff there is sand, probably 18-20 above river, & below it clayey springs, near water.

This is ~~W.N.W.~~ N.W. end of bluff. This is all Aftonian, with Kansan above.

Woods Claude's Park  
8/9/10

159

~~Emptoria fusca  
action bicolor  
Carya glabra  
Osmunda  
Cryptotaenia  
Hemlock  
Scrophularia mollis  
Orchis  
Hyssopus  
Rhus fulva  
" am.  
Zizia am.  
Asplenium  
Juniperus communis  
Chenopodium hybridum~~

Notes of Sep. 2, 1910.

The Aftonian is well developed in the Peterson's crescent, & springs are good & strong.

At east end of road, just before I started down the river toward Peterson's, there are several small cuts in road which show nothing but Kansan, and there is evidence of Kansan everywhere. That plain running toward east is certainly Kansan.



- 1- Facies
- 2- Principal
- 3- Scarpa
- 4- Family
- 5- Rather rare
- 6- Very rare
- 7- Occasional.

S-96-17

185 specimens

558

S-96-06

98 specimens

204

S-96-01.

Reading at 67 and 7-1875





